6.2 AIR QUALITY

This section describes existing air quality conditions, maximum potential impacts from the Project, and mitigation measures that keep these impacts below thresholds of significance. The Project will use combined-cycle generation technology to replace existing Units 1, 2, 3, and 4, minimizing the amount of fuel needed to produce electricity, emissions of criteria pollutants, and potential effects on ambient air quality.

Other beneficial environmental aspects of the Project that minimize adverse air quality include the following:

- Clean-burning natural gas as fuel.
- Selective catalytic reduction (SCR) to minimize NOx emissions.
- Oxidation catalysts to reduce carbon monoxide emissions.
- Appropriately sized stacks to reduce ground-level concentrations of exhaust constituents.

This section presents the methodology and results of the air quality analyses performed to assess potential impacts associated with air emissions from the construction of the Project. Potential public health risks posed by emissions of noncriteria pollutants are also addressed in Section 6.16 (Public Health).

Section 6.2.1 provides a summary of this air quality section. Existing air quality conditions are described in Sections 6.2.2 through 6.2.4. Applicable regulations are discussed in Section 6.2.5. The methodology used in the quantitative air quality analysis and the resulting potential impacts are presented in Section 6.2.6. Consistency with laws, ordinances, regulations, and standards (LORS) is discussed in Section 6.2.7. The protocol for analyzing cumulative air quality impacts is presented in Section 6.2.8. Measures that mitigate the potential impacts to air quality are discussed in Section 6.2.9. References cited in this chapter are listed in Section 6.2.10.

6.2.1 SUMMARY OF AIR QUALITY IMPACTS

Duke is proposing to replace the four existing boilers at MBPP with four new combined-cycle turbines. Combined-cycle turbine technology is a more efficient way to generate electricity, requiring less fuel than the old boilers to generate the same amount of power. These new combined-cycle turbines produce very low levels of air pollutant emissions, and their emissions of oxides of nitrogen will be controlled to even lower levels using selective catalytic reduction (SCR) technology.

Before the new turbines can be built, Duke needs to receive regulatory approval from three agencies that will review the air quality impacts of the proposed project: the San Luis Obispo County Air Pollution Control District (SLOCAPCD or District), the Environmental Protection Agency (EPA), and the California Energy Commission. Each agency has its own set of standards for review, but the goals of the agencies are the same:

- to ensure that the operation of the new turbines will not cause or contribute to the violation of any health-based ambient air quality standards; and
- to ensure that the emissions of potentially toxic pollutants from the turbines will not cause any health hazards.

Each agency's review asks several questions about the project. The questions are as follows:

- What is the existing air quality in the area?
- How much will the new turbines operate?
- What are the air pollutant emissions from the new project?
- How do these compare with the emissions from the existing power plant?
- Is the new project using the best control technology available to control its emissions?
- How will the new project mitigate any increase in emissions over existing levels?
- Once the project is in operation, what will be the effect on air quality in the area?
- Will the new project emit toxic pollutants in quantities that could be harmful to the health of the most sensitive members of the community?

The air quality section of the AFC answers these questions in detail. The purpose of this summary is to provide an outline of the information in the AFC that answers these questions. The summary refers the reader to specific sections of the AFC to find more information about each topic. Finally, the sections of the AFC often refer the reader to appendices that contain the detailed calculations that support each conclusion.

6.2-1.1 What is the existing air quality in the area?

EPA has established national ambient air quality standards (NAAQS) for ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), and fine particulate matter (PM_{10}). Areas with air pollution levels above these standards can be considered Anonattainment areas@ subject to planning and pollution control requirements that are more stringent than standard requirements.

In addition, the California Air Resources Board (ARB) has established standards for ozone, CO, NO_2, SO_2, sulfates, PM_{10}, airborne lead, hydrogen sulfide, and vinyl chloride at levels designed to protect the most sensitive members of the population, particularly children, the elderly, and people who suffer from lung or heart diseases.

Both state and national air quality standards consist of two parts: an allowable concentration of a pollutant, and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation, and, in some cases, damage to paint and other materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (one hour, for instance) or to a relatively lower average concentration over a longer period (8 hours, 24 hours, or 1 month). For some pollutants there is more than one air quality standard, reflecting both their short-term and long-term effects. The California standards are generally set at concentrations much lower than the federal standards and in some cases have shorter averaging periods. Air quality in the District is in attainment with most of the federal and state standards, with the exception of the federal ozone standard and the state 24-hour PM_{10} standard. While ozone levels in Morro Bay are in compliance with the federal standard, levels measured elsewhere in the District are above the standards and as a result the District is considered “nonattainment” for ozone. The state 24-hour PM_{10} standard is significantly lower than the federal standard (50 ug/m^3 vs. 150 ug/m^3), and most areas of the state exceed the state standard but are below the federal standard.

Three ambient air monitoring stations were used to characterize air quality at the Project site. These stations were used because of their proximity to the Project site and because they record area-wide ambient conditions rather than the localized impacts of any particular facility. Ambient concentrations of ozone and fine particulate matter (PM_{10}) are recorded at a monitoring station in Morro Bay. Carbon monoxide (CO) and nitrogen dioxide (NO_2) are monitored in San Luis Obispo. Sulfur dioxide (SO_2) is monitored at Grover City. Table 6.2-1 summarizes the ambient concentrations of air pollutants measured in or near Morro Bay between 1997 and 1999 and compares them with the federal and state ambient air quality standards.

TABLE 6.2-1
MAXIMUM BACKGROUND CONCENTRATIONS, 1997-1999 ($\mu g/m^3$)

POLLUTANT	AVG TIME	Maximum Monitored Concentration			Air Quality Standard	
		1997	1998	1999	State	Federal
Ozone[1]	1 hour	0.06	0.07	0.10	0.09	0.12
NO_2	1-Hour	122	115	120	470	n/a
	Annual	25	23	25	n/a	100
CO	1-Hour	6,988	4,571	5,714	23,000	40,000
	8-Hour	3,028	2,555	3,444	10,000	10,000
SO_2	1-Hour	106	47	104	655	n/a
	24-hour	8	10	13	105	365
	Annual	0	0	0	n/a	80
PM_{10}	24-Hour	57	33	39	50	150
	AAM[2]	20.6	13.5	14.4	n/a	50
	AGM[3]	18.6	14.6	15.7	30	n/a

Notes:
1. Ozone concentration expressed in parts per million.
2. Annual arithmetic mean.
3. Annual geometric mean.

6.2.1.2 How much will the new turbines operate?

Duke expects that each new turbine will operate up to 8,400 hours per year, out of a possible 8,760 hours. Because these turbines will run only when there is a demand for electricity, each turbine may be shut down at night and started up in the morning. Thus Duke is planning that during up to 400 of those 8,400 hours, each turbine may be starting up or shutting down.

Each turbine and heat recovery steam generator (HRSG) is equipped with duct burners that add heat to the steam generator. This allows each steam generator to generate more steam for the steam turbine, so that when demand for electricity is high, each turbine/HRSG can produce more electricity. Duke plans that the duct burners may operate up to 16 hours each day and up to 4,000 hours each year.

6.2.1.3 What are the air pollutant emissions from the new project, and how do they compare with the emissions from the existing power plant?

Air pollutant emissions from the new turbines are calculated using proposed emissions limits during each of the operating modes described above: startup/shutdown, base load (without duct burning), and with duct burning. The proposed emissions limits will become permit conditions, as will the limits on hours of operation in the various modes. Emissions, fuel use, and generation will be monitored continuously for each turbine to ensure that the turbines/HRSGs are always in compliance with their permit limits. Table 6.2-2 shows the highest allowable hourly, daily, and annual emissions from the four new turbines/HRSGs. Detailed calculations are shown in Section 6.2.6.2.2 of the AFC.

TABLE 6.2-2
EMISSIONS FROM NEW TURBINES

	NOx	SO_2	CO	VOC	PM_{10}
Maximum Hourly Emissions, lb/hr	198.6	5.8	1,296.5	42.8	53.2
Maximum Daily Emissions, lb/day	2,784.0	134.4	12,119.2	644.3	1,203.2
Maximum Annual Emissions, tpy	292.3	23.0	917.4	77.6	203.2

Emissions from the existing boilers are characterized by the average emissions over the past two years (August 1998 through July 2000)*. The boilers have emissions monitors that continuously measure NOx and CO emissions, forming the basis for the NOx and CO emissions shown below for the boilers. The SO_2 emissions are calculated from the very small quantity of sulfur in the fuel. The VOC and PM_{10} emissions are calculated using standard EPA emission factors. Table 6.2-3 shows the emissions from the existing boilers. Detailed calculations are shown in Section 6.2.6.2.1 of the AFC.

TABLE 6.2-3
EMISSIONS REDUCTIONS FROM EXISTING BOILERS

	EMISSIONS, tons per year				
	NOx	SO_2	CO	VOC	PM_{10}
Unit 1	193.3	1.1	80.0	10.3	14.2
Unit 2	273.5	1.3	24.8	12.2	16.8
Unit 3	170.9	3.7	644.7	33.9	46.9
Unit 4	217.7	3.9	686.5	35.7	49.3
Total	855.4	10.0	1,436.0	92.1	127.2

Table 6.2-4 compares the emissions from the new turbines with the emissions from the existing boilers.

* Different baseline periods are required for different regulatory programs, as discussed further below. The two-year baseline presented here is used for purposes of CEQA and federal programs.

TABLE6.2-4
COMPARISON OF EMISSIONS FROM NEW TURBINES AND EXISTING BOILERS

	EMISSIONS (tons per year)						
	NOx	SO_2	CO	VOC	PM_{10}	Total O_3 Precursors	Total PM_{10} Precursors
New Turbines	292.3	23.0	917.4	77.6	203.2	369.9	596.1
Existing Boilers	855.4	10.0	1,436.0	92.1	127.2	947.5	1,084.7
Difference	(-563.1)	13.0	(-518.6)	(-14.5)	76.0	(-577.6)	(-488.6)

6.2.1.4 Is the new project using the best control technology available to control its emissions?

The project is required to use best available control technology to control its emissions. The applicant has reviewed permit requirements approved by the EPA, the state Air Resources Board, and the CEC staff and believes that the following emissions limits reflect the best available controls:

NOx: 2.5 parts per million by volume, dry (ppmvd), corrected to 15% O_2
SO_2: Use of natural gas fuel with a sulfur content not to exceed 0.25 grains per 100 standard cubic feet
CO: 6 ppmvd, corrected to 15% O_2
VOC: 2 ppmvd, corrected to 15% O_2
PM_{10}: 11 pounds per hour without duct firing; 13.3 pounds per hour with duct firing

A detailed discussion of control technology options can be found in Section 6.2.7.3 of the AFC.

6.2.1.5 How will the new project offset any increase in emissions over existing levels?

Duke is required to provide offsets for any increase in emissions that will result from the operation of the new turbines. Many of the emissions offsets will come from the shutdown of the existing boilers.* The District has also granted Duke ERCs in exchange for eliminating fuel oil use in the existing boilers, and Duke will use these ERCs to offset a portion of the increase as well. Finally, as discussed further below, Duke has purchased ERCs from Chevron that will be used to offset the remainder of the emissions increase from the project.

* The District discounts emissions reductions from shutdowns by 20% or more before granting emission reduction credits, or ERCs. Therefore, Duke will receive only 8 or fewer tons of credit for every 10 tons of emissions eliminated by shutting down the existing boilers.

District regulations allow the use of interpollutant offsets in situations where one pollutant is a precursor to another. For example, since both NOx and VOC emissions are precursors of ozone, Duke will use extra VOC ERCs to offset some of its NOx emissions increases. Similarly, since SO_2 contributes to the formation of PM_{10}, Duke will use extra SO_2 ERCs to offset some of its PM_{10} increases. Offsets are discussed in detail in Section 6.2.7.3.2 of the AFC.

6.2.1.6 Once the project is in operation, what will be the effect on air quality in the area?

Federal and District regulations and CEC requirements necessitate an analysis of the impact of the project on ambient air quality to ensure that the project will not cause or contribute to the violation of any state or federal ambient air quality standards and increments. Air quality impacts are evaluated using EPA-approved computer models that use worst-case emission rates, exhaust stack parameters (including stack heights and exhaust flow rates), and local meteorology to simulate the dispersion of emissions and to determine the maximum ground-level impacts. These models account for the effects of nearby buildings and local terrain. As requested by the SLOCAPCD, Duke has used three years of weather data (wind speed, wind direction and temperature) measured at the plant, and inversion heights measured at Vandenberg AFB, to ensure that impacts are evaluated under the most extreme conditions.

The dispersion of emissions from existing boilers and the new turbines were modeled to determine their impacts on ambient air quality. For the turbines, Duke also looked at modeled impacts during startup when emission rates may be high for short periods of time, during times in the early morning when mixing heights are very low (potentially causing inversion breakup fumigation), and during periods when a temperature difference between land and water cause the exhaust plumes to loop down before much dispersion of the pollutants has occurred (shoreline fumigation). EPA-approved models are designed to be conservative, so the modeling results typically overestimate the actual concentrations that would be measured.

Maximum modeled impacts from both the boilers and the turbines were found to occur on Morro Rock. When the receptors on the Rock are excluded, modeled impacts from the turbines are found to be much lower. Modeling results are summarized in Table 6.2-6.

TABLE 6.2-5
SUMMARY OF MODELING RESULTS[1]

POLLUTANT	AVERAGING TIME	MODELED CONCENTRATIONS ($\mu g/m^3$)			
		ISCST3	FUMIGATION	SHORELINE FUMIGATION	STARTUP
NOx[2]	1-hour Annual	220.4 2.6	13.3 --	105.1 --	185.9 --
SO_2	1-hour 3-hour 24-hour Annual	17.3 11.9 2.7 0.23	1.03 0.93 0.41 --	8.1 4.1 0.54 --	11.9 8.3 -- --
CO	1-hour 8-hour	326.3 1,508.3	19.5 159.3	153.6 347.7	8,615.4 --
PM_{10}	24-hour Annual	24.2 2.7	3.6 --	4.6 --	-- --

(1) New combined cycle units only.
(2) Modeled using ISC_OLM with concurrent ozone data to account for ozone limiting of NO_2 formation.

The highest modeled turbine impacts under any of these conditions were added to the highest background concentration measured at nearby air quality monitoring stations during the past three years to demonstrate that the combination of the new project with existing background pollutant concentrations will not cause any standards to be exceeded. This comparison is shown in Table 6.2-6. To be conservative, this analysis does not take into account the improvement in air quality that will result from shutting down the existing boilers.

TABLE 6.2-6
MODELED MAXIMUM PROJECT IMPACTS

POLLUTANT	AVERAGING TIME	MAXIMUM PROJECT IMPACT (1) ($\mu g/m^3$)	BACKGROUND CONCEN-TRATIONS ($\mu g/m^3$)	TOTAL IMPACT ($\mu g/m^3$)	STATE STANDARD ($\mu g/m^3$)	FEDERAL STANDARD ($\mu g/m^3$)
NO_2	1-hour Annual	220.4 2.6	122 25	 27.6	470 --	-- 100
SO_2	1-hour 24-hour Annual	17.3 2.7 0.23	106 13 0	123.3 15.7 0.23	650 109 --	-- 365 80
CO	1-hour 8-hour	8,615.4 1,508.3	6,988 3,444	15,603.4 4,952.3	23,000 10,000	40,000 10,000
PM_{10}	24-hour Annual(2) Annual(3)	24.2 2.7 2.7	57 20.6 18.6	81.2 23.3 21.3	50 30 --	150 -- 50

(1) New combined cycle units only
(2) Annual geometric mean
(3) Annual arithmetic mean

The ambient air quality analysis and the data used to represent background concentrations are discussed in detail in Section 6.2.6.3 of the AFC.

6.2.1.7 Will the new project emit toxic pollutants in quantities that could be harmful to the health of the most sensitive members of the community?

SLOCAPCD Rule 219, Toxics New Source Review, and CEC licensing procedures require an assessment of the potential impacts of the project on public health and a demonstration that the emissions of potentially toxic substances from the project will not pose a health hazard to the most sensitive members of the community. This demonstration was made using a screening health risk assessment. In a screening health risk assessment, the short-term (acute), long-term (chronic), and carcinogenic impacts of exposures to potentially toxic substances are compared with generally accepted risk criteria to show that the project is safe. The screening health risk assessment is carried out in three steps:

- Estimate emissions of toxic, or noncriteria pollutants, from each source;
- Use dispersion modeling to calculate the ground-level concentration of each pollutant; and
- Use scientifically derived cancer unit risk factors and acute and chronic reference exposure levels (levels below which no harmful effects are observed) to evaluate carcinogenic risk and chronic and acute noncancer health hazards.

A screening health risk assessment was performed for both the existing plant (the existing boilers plus the Diesel-fueled fire pumps and emergency generator, and gasoline dispensing facility) and the new project (new turbines plus the existing support equipment). Toxic emissions were calculated using ARB-approved emission factors and emissions measurements. The dispersion modeling used the same EPA-approved models and meteorological data that were used in modeling criteria pollutant impacts.

The results of the screening health risk assessment for the new turbines are compared with the limits of District Rule 219 in Table 6.2-7 below; the results are well below all significance levels.

TABLE 6.2-7
HEALTH RISK ASSESSMENT RESULTS

	Turbines	Significance Threshold
Cancer Risk to Maximally Exposed Individual	0.1 in one million	1 in one million
Acute Noncancer Hazard Index	0.08	0.1
Chronic Noncancer Hazard Index	0.001	0.1

The screening health risk assessment is discussed in detail in Sections 6.2.6.4 and 6.16 (Public Health) of the AFC.

6.2.2 EXISTING CONDITIONS

6.2.2.1 Geography and Topography

The Project is located on the site of the existing Morro Bay Power Plant (MBPP) in the city of Morro Bay, between State Highway 1 and the Pacific Ocean. The Project site is level, at an elevation of approximately 20 feet above sea level, approximately 0.2 miles from the Pacific Ocean. The nearest residences are approximately one-quarter mile southeast. Immediately west of the Project site and extending north approximately two miles is the Morro Strand State Beach. To the south of the site lie Morro Bay, Morro Bay State Park, the Montaña De Oro State Park, and Morro Dunes Natural Preserve. The towns of Baywood Park, Los Osos, and Cuesta-by-the-Sea lie approximately four miles to the south. To the southeast of the Project site is the city of Morro Bay. Northeast of the Project is the valley of Morro Creek. Due east of the site the hills of the Coast Range rise to heights of 500 to 600 feet within one mile. Approximately 0.6 mile west-southwest of the site lies Morro Rock, elevation 578 feet.

6.2.2.2 Climate and Meteorology

The overall climate at the Project site is dominated by the semi-permanent eastern Pacific high pressure system centered off the coast of California. This high is centered between the 140° west (W) and 150° W meridians, and oscillates in a north-south direction. Its position governs California=s weather. In the summer, the high moves to its northernmost position, which results in a strong subsidence inversion and clear skies inland; along the coast, the weather is dominated by coastal stratus and fog caused by the cooler and more homogeneous ocean surface temperature. Often in the summer, fog comes onshore during late afternoon and persists until the middle of the following morning.

In the winter, the high moves southwestward toward Hawaii, which allows storms originating in the Gulf of Alaska to reach northern California, bringing wind and rain. About 80 percent of the region=s annual rainfall (10 to 30 inches, depending on altitude and proximity to the ocean) occurs between November and March.[1] Average precipitation at the Project site is about 16 inches per year. Between storms, skies are fair, winds are light, and temperatures are moderate.

Temperature, wind speed, and direction data have been recorded at a meteorological monitoring station at the Project site, operated by the Pacific Gas and Electric Company (PG&E) at MBPP. Temperatures at the site are moderated by the proximity to the ocean. In summer, daily temperatures at Morro Bay range from the low 50s to the mid-70s (degrees Fahrenheit [°F]). In winter, average lows are about 42° F, and average highs are about 60° F.[2]

Air quality is determined primarily by the type and amount of pollutants emitted into the atmosphere, the topography of the air basin, and local meteorological conditions. In the Project area, stable atmospheric conditions and light winds can provide conditions for pollutants to accumulate in the air basin when emissions are produced. The predominant winds in California are shown in Figures 6.2-1 through 6.2-4. As indicated in the figures, winds in California generally are light and easterly in the winter, but strong and westerly in the spring, summer, and fall.

Wind patterns at the Project site can be seen in Figures 6.2-5a through 6.2-7e, which show quarterly and annual wind roses for meteorological data collected at the PG&E Morro Bay weather station during 1994, 1995 and 1996. It can be seen that the winds are persistent (only 14 percent calm conditions) and predominantly from the western quadrant. On an annual basis, approximately 18 percent of the winds come from west-northwest, and a total of about 44 percent from southwest through northwest. Winds are predominantly from the northeast during the winter months.

The marine climate influences mixing heights. Often, the base of the inversion is found at the top of a layer of marine air, because of the cooler nature of the marine environment. Inland areas, where the marine influence is absent, often experience strong ground-based inversions, which inhibit mixing and can result in high pollutant concentrations. Smith, et al, (1984) reported that at Vandenburg Air Force Base, the nearest upper-level meteorological station (located approximately 45 miles SE of the Project site), 50th percentile morning mixing heights for the period 1979–80 were on the order of 900-1300 feet (270-395 meters) in summer and fall,

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1 "Climate of the States—California," U.S. Department of Commerce, Weather Bureau, December 1959.
2 Ibid.

and 1,700–3,500 feet (530-1,055 meters) in winter and spring. The 50th percentile afternoon mixing heights ranged from 1350 and 1450 feet (415–445 meters) in summer and fall, and from 3250 to over 3900 feet (990 to >1200 meters) in winter and spring. Such mixing heights provide generally favorable conditions for the dispersion of pollutants.

6.2.3 OVERVIEW OF AIR QUALITY STANDARDS

The U.S. Environmental Protection Agency (EPA) has established national ambient air quality standards (NAAQS) for ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with aerodynamic diameter less than or equal to 10 microns (PM_{10}), particulate matter with aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and airborne lead. Areas with air pollution levels above these standards can be considered “nonattainment areas” subject to planning and pollution control requirements that are more stringent than standard requirements.

In addition, the California Air Resources Board (ARB) has established standards for ozone, CO, NO_2, SO_2, sulfates, PM_{10}, airborne lead, hydrogen sulfide, and vinyl chloride at levels designed to protect the most sensitive members of the population, particularly children, the elderly, and people who suffer from lung or heart diseases.

Both state and national air quality standards consist of two parts: an allowable concentration of a pollutant, and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation, and, in some cases, damage to paint and other materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (one hour, for instance), or to a relatively lower average concentration over a longer period (8 hours, 24 hours, or 1 month). For some pollutants there is more than one air quality standard, reflecting both short-term and long-term effects. Table 6.2-8 presents the NAAQS and California ambient air quality standards for selected pollutants. The California standards are generally set at concentrations much lower than the federal standards and in some cases have shorter averaging periods.

EPA=s new NAAQS for ozone and fine particulate matter went into effect on September 16, 1997. For ozone, the previous one-hour standard of 0.12 ppm was replaced by an eight-hour average standard at a level of 0.08 ppm. Compliance with this standard will be based on the three-year average of the annual 4th-highest daily maximum eight-hour average concentration measured at each monitor within an area.

The NAAQS for particulates were revised in several respects. First, compliance with the current 24-hour PM_{10} standard will now be based on the 99th percentile of 24-hour concentrations at each monitor within an area. Two new $PM_{2.5}$ standards were added: a standard of 15 ☞g/m^3, based on the three-year average of annual arithmetic means from single or multiple monitors (as available); and a standard of 65 ☞g/m^3, based on the three-year average of the 98th percentile of 24-hour average concentrations at each monitor within an area.

Recent court decisions have delayed the implementation of these new standards.

TABLE 6.2-8
AMBIENT AIR QUALITY STANDARDS

POLLUTANT	AVERAGING TIME	CALIFORNIA	NATIONAL
Ozone	1 hour 8 hours	0.09 ppm -	0.12 ppm 0.08 ppm (3-year average of annual 4th-highest daily maximum)
Carbon Monoxide	8 hours 1 hour	9.0 ppm 20 ppm	9 ppm 35 ppm
Nitrogen Dioxide	Annual Average 1 hour	- 0.25 ppm	0.053 ppm -
Sulfur Dioxide	Annual Average 24 hours 3 hours 1 hour	- 0.04 ppm (105 μg/m^3) - 0.25 ppm	80 μg/m^3 (0.03 ppm) 365 μg/m^3 (0.14 ppm) 1300[1] μg/m^3 (0.5 ppm) -
Suspended Particulate Matter (10 Micron)	Annual Geometric Mean 24 hours Annual Arithmetic Mean	30 μg/m^3 50 μg/m^3 -	- 150 μg/m^3 50 μg/m^3
Suspended Particulate Matter (2.5 Micron)	Annual Arithmetic Mean 24 hours	- -	15 μg/m^3 (3-year average) 65 μg/m^3 (3-year average of 98th percentiles)
Sulfates	24 hours	25 μg/m^3	-
Lead	30 days Calendar Quarter	1.5 μg/m^3 -	- 1.5 μg/m^3
Hydrogen Sulfide	1-hour	0.03 ppm	-
Vinyl Chloride	24-hour	0.010 ppm	-
Visibility Reducing Particles	8-hour (10am to 6pm PST)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.	-

(1) This is a national secondary standard, which is designed to protect public welfare.

6.2.4 AIR QUALITY TRENDS (CRITERIA POLLUTANTS)

Three ambient air monitoring stations were used to characterize air quality at the Project site. These stations were used because of their proximity to the Project site and because they record area-wide ambient conditions rather than the localized impacts of any particular facility.* All ambient air quality data presented in this section were taken from ARB publications and data sources. Ambient concentrations of ozone and fine particulate matter (PM_{10}) are recorded at a monitoring station in Morro Bay operated by the San Luis Obispo County APCD. Carbon monoxide (CO) and nitrogen dioxide (NO_2) are monitored in San Luis Obispo at a station operated by the ARB. Sulfur dioxide (SO_2) is monitored at Grover City at a station operated by the San Luis Obispo County APCD. SO_2 was also monitored at Morro Bay through 1995 at a station operated by the San Luis Obispo County APCD. Ambient SO_2 data from both monitoring sites are presented in this discussion. Particulate sulfates and airborne lead have not been monitored anywhere in San Luis Obispo County since before 1988.

6.2.4.1 Ozone

Ozone is generated by complex reactions between reactive organic gases (ROG) and oxides of nitrogen (NOx) in the presence of ultraviolet radiation. ROG and NOx emissions from vehicles and stationary sources, in combination with daytime wind flow patterns, mountain barriers, a persistent temperature inversion, and intense sunlight, result in high ozone concentrations. San Luis Obispo County is in attainment of the federal ozone standard, but is designated a nonattainment area for the more stringent state standard, due to violations that occur at various locations throughout the county.

Maximum ozone concentrations at the Morro Bay station are usually recorded during the summer months. Table 6.2-9 shows the annual maximum hourly ozone levels recorded at the Morro Bay station during the period from 1990–1999, as well as the number of days in which the state and federal standards were exceeded. The data show that the state ozone air quality standard has been exceeded on only one day in 1991, 1992 and 1999. The federal standard was not exceeded during the 10-year period.

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* A more extensive discussion of why the data from these stations are considered to be representative of air quality in the vicinity of the proposed project is provided in Section 6.2.6.3.3.

TABLE 6.2-9
OZONE LEVELS AT MORRO BAY
1990-1999
(parts per million - ppm)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Highest 1-Hour Average	.09	.10	.10	.08	.06	.07	.07	.06	.07	.10
Number of Days Exceeding:										
State Standard (0.09 ppm, 1-hour)	0	1	1	0	0	0	0	0	0	1
Federal Standard (0.12 ppm, 1-hour)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, California Air Resources Board

The long-term trends of maximum one-hour ozone readings and violations of the state standard are shown in Figures 6.2-8a and 6.2-8b, respectively, for Morro Bay. These charts illustrate that violations of the ozone standards are rare.

6.2.4.2 Nitrogen Dioxide

Nitrogen dioxide is formed primarily from reactions in the atmosphere between nitric oxide (NO) and oxygen or ozone. Nitric oxide is formed during high temperature combustion processes, when the nitrogen and oxygen in the combustion air combine. Although NO is much less harmful than NO_2, it is converted to NO_2 in the atmosphere within a matter of hours, or even minutes under certain conditions. For purposes of state and federal air quality planning, San Luis Obispo County is in attainment for NO_2.

Table 6.2-10 shows the annual maximum one-hour NO_2 levels recorded at the San Luis Obispo monitoring station each year from 1990 through 1999, as well as the annual average level for each of those years. During this period, there have been no violations of either the state one-hour standard (0.25 ppm) or the federal annual average standard (0.053 ppm). Figure 6.2-9 shows the trend from 1990 through 1999 of maximum one-hour NO_2 levels at San Luis Obispo. These have been well below the state standard of 0.25 ppm for many years.

TABLE 6.2-10
NITROGEN DIOXIDE LEVELS AT SAN LUIS OBISPO
1990-1999
(parts per million - ppm)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Highest 1-Hour Average	.07	.07	.06	.07	.07	.07	.06	.07	.06	.06
Annual Average	.014	.014	.013	.014	.015	.013	.013	.013	.012	.013
Number of Exceedances:										
State Standard (Days) (0.25 ppm, 1-hour)	0	0	0	0	0	0	0	0	0	0
Federal Standard (Years) (0.052 ppm, annual)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, California Air Resources Board

6.2.4.3 Carbon Monoxide

Carbon monoxide is a product of inefficient combustion, principally from automobiles and other mobile sources of pollution. In many areas of California, CO emissions from wood-burning stoves and fireplaces can also be measurable contributors. Industrial sources typically contribute less than 10% of ambient CO levels. Peak CO levels occur typically during winter months, due to a combination of higher emission rates and stagnant weather conditions. For purposes of state and federal air quality planning, San Luis Obispo County is classified as being in attainment for CO.

Table 6.2-11 shows the California and federal air quality standards for CO, and the maximum one-hour and eight-hour average levels recorded at the San Luis Obispo monitoring station during the period from 1990–1999.

Trends of maximum eight-hour and one-hour average CO are shown in Figures 6.2-10 and 6.2-11, respectively, which show that maximum ambient CO levels at San Luis Obispo have been below the state standards for many years, and continue to decline.

TABLE 6.2-11
CARBON MONOXIDE LEVELS AT SAN LUIS OBISPO
1990-1999
(parts per million - ppm)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Highest 8-hour average	4.1	3.3	3.1	3.2	3.4	3.1	2.9	2.6	2.3	3.1
Highest 1-hour average	10	8	8	9	6	6	5	6	4	5
Number of days exceeding:										
State Standard (20 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0
State Standard (9.0 ppm, 8-hr)	0	0	0	0	0	0	0	0	0	0
Federal Standard (35 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0
Federal Standard (9 ppm, 8-hr)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, California Air Resources Board

6.2.4.4 Sulfur Dioxide

Sulfur dioxide is produced when any sulfur-containing fuel is burned. It is also emitted by chemical plants that treat or refine sulfur or sulfur-containing chemicals. Natural gas contains a negligible amount of sulfur, while fuel oils contain much larger amounts. Because of the complexity of the chemical reactions that convert SO_2 to other compounds (such as sulfates), peak concentrations of SO_2 occur at different times of the year in different parts of California, depending on local fuel characteristics, weather, and topography. San Luis Obispo County is considered to be in attainment for SO_2 for purposes of state and federal air quality planning.

Table 6.2-12 presents the state air quality standard for SO_2 and the maximum levels recorded in Grover City from 1988 through 1997 and from Morro Bay from 1988 through 1995 (after which monitoring ceased). Maximum one-hour average readings have been an order of magnitude below the state standard. The federal annual average standard is 0.03 ppm; during most of the period shown, annual average SO_2 levels at these two sites have been less than one-tenth of the federal standard. Figure 6.2-12 shows that for several years the maximum SO_2 levels at both sites generally have been less than one fifth of the state standard.

TABLE 6.2-12
SULFUR DIOXIDE LEVELS IN SAN LUIS OBISPO COUNTY
MORRO BAY AND GROVER CITY
1988–1997
(parts per million/ppm)

		1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Highest 1-Hour Average	Morro Bay	.05	.02	.02	.01	.01	.01	.01	.02	--	--
	Grover City	.03	.03	.08	.03	.03	.04	.04	.03	.03	.04
Annual Average	Morro Bay	.013	.000	.000	.000	.000	.000	.000	.000	--	--
	Grover City	.006	.001	.001	.000	.000	.000	.000	.000	.000	.001
Number of Exceedances:											
State Standard (Days) (0.25 ppm, 1-hr)		0	0	0	0	0	0	0	0	0	0
Federal Standard (Years) (0.03 ppm, annual)		0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, California Air Resources Board

6.2.4.5 Particulate Sulfates

Particulate sulfates are the product of further oxidation of SO_2. Elevated levels can also result from natural causes, such as sea spray. San Luis Obispo County is in attainment with the state standard for sulfates. There is no federal standard for sulfates.

Due to the extremely low levels found, sulfates have not been monitored in San Luis Obispo County since 1987 and have not been monitored anywhere in either the North Central Coast or the South Central Coast air basin since 1990. Table 6.2-13 presents maximum 24-hour average sulfate levels recorded at Santa Maria, in Santa Barbara County, the monitoring station closest to the Project site, for the period of 1988–1990. During the period when sulfates were monitored at both San Luis Obispo and Santa Maria, the levels at Santa Maria were typically 12 to 2 times higher than those at San Luis Obispo. Therefore, the levels shown in Table 6.2-13, while well below the state standard, still provide a conservatively high estimate of actual sulfate levels at Morro Bay.

TABLE 6.2-13
PARTICULATE SULFATE LEVELS IN SOUTH CENTRAL COAST AIR BASIN
(SANTA MARIA)
1988–1997
(micrograms per cubic meter - $\mu g/m^3$)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Highest 24-Hour Average	13.9	9.1	11.4	--	--	--	--	--	--	--
Number of Days Exceeding State Standard (25 $\mu g/m^3$, 24-hour)	0	0	0	--	--	--	--	--	--	--

Source: California Air Quality Data, Annual Summary, California Air Resources Board

6.2.4.6 Fine Particulates (PM_{10})

Particulates in the air are caused by a combination of wind-blown fugitive dust; particles emitted from combustion sources (usually carbon particles); and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides, and NOx, respectively. In 1984, the ARB adopted standards for fine particulates and phased out the total suspended particulate (TSP) standards that had been in effect until then. PM_{10} standards were substituted for TSP standards because PM_{10} corresponds to the size range of inhalable particulates related to human health. In 1987, EPA also replaced national TSP standards with PM_{10} standards. For air quality planning purposes, San Luis Obispo County is considered to be in attainment of federal PM_{10} standards, but in nonattainment of state standards.

As discussed above, the NAAQS for particulates were further revised by EPA with new standards that went into effect on September 16, 1997. In light of recent court decisions, EPA will delay implementation of the new $PM_{2.5}$ standards for an indefinite period.

Table 6.2-14 shows the federal and state air quality standards for PM_{10}, maximum levels, and geometric and arithmetic annual averages recorded at Morro Bay from 1990, when PM_{10} monitoring began, through 1999. Maximum 24-hour PM_{10} levels exceeded the state standard in 1991, 1993, and 1997, but are consistently lower than the new federal standard based on 99th percentile concentrations. Annual average PM_{10} levels meet both state and federal standards.

The trend of maximum 24-hour average PM_{10} levels is plotted in Figure 6.2-13, and the trend of expected violations of the state 24-hour standard of 50 μg/m^3 is plotted in Figure 6.2-14. Note that since PM_{10} is measured only once every six days, expected violation days are six times the number of measured violations.

$PM_{2.5}$ has been measured at only one site in the South Central Coast Air Basin (Arroyo Grande) for only one year (1995). The highest 24-hour average reading recorded was 25 μg/m^3, which is well below the federal standard (65 μg/m^3) that will be applied to the three-year average 98th percentile reading.

TABLE 6.2-14
PM_{10} LEVELS AT MORRO BAY
1990–1999
(micrograms per cubic meter - μg/m^3)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Highest 24-Hour Average	40	51	38	64	48	40	42	57	33	39
Annual Geometric Mean (State Standard = 30 μg/m^3)	24.1	20.0	17.8	18.6	18.3	18.6	16.6	18.6	13.5	14.4
Annual Arithmetic Mean (Federal Standard = 50 μg/m^3)	25.8	22.9	19.4	21.2	19.5	22.3	18.7	20.6	14.6	15.7
Number of Days Exceeding:										
State Standard (50 μg/m^3, 24-hour)	0	1	0	2	0	0	0	1	0	0
Federal Standard (150 μg/m^3, 24-hour)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, California Air Resources Board

6.2.4.7 Airborne Lead

Lead in the air results from the combustion of fuels that contain lead. Twenty-five years ago, motor vehicle gasolines contained relatively large amounts of lead compounds used as octane-rating improvers, and ambient lead levels were relatively high. Beginning with the 1975 model year, manufacturers began equipping new automobiles with exhaust catalysts, which were poisoned by the exhaust products of leaded gasoline. Thus, unleaded gasoline became the required fuel for an increasing fraction of new vehicles, and the phaseout of leaded gasoline began. As a result, ambient lead levels decreased dramatically, and for several years San Luis

Obispo County has been in attainment of state airborne lead levels for air quality planning purposes.

Due to the extremely low levels expected, airborne lead has not been monitored in San Luis Obispo County since 1987, and was monitored elsewhere in the South Central Coast Air Basin only through 1989. During 1987–1989, the closest monitoring site was at Lompoc, in Santa Barbara County. Lead levels at Lompoc are presented in Table 6.2-15. In the years prior to 1988, airborne lead levels at San Luis Obispo and at Lompoc were of similar magnitudes; therefore, the levels shown in Table 6.2-15 are considered typical of those that actually occur at the Project site, i.e., well below the state standard.

TABLE 6.2-15
AIRBORNE LEAD LEVELS IN SOUTH CENTRAL COAST AIR BASIN
(LOMPOC)
1988–1997
(micrograms per cubic meter - μg/m^3)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Highest Monthly Average	.06	.06	--	--	--	--	--	--	--	--
Number of Days Exceeding State Standard (1.5 μg/m3, monthly)	0	0	--	--	--	--	--	--	--	--

Source: California Air Quality Data, Annual Summary, California Air Resources Board

6.2.5 REGULATORY SETTING

Applicable federal, state, and local laws, ordinances, regulations and standards that govern air quality and air pollution are discussed in this section. Specific requirements are identified and the compliance of the proposed Project with these requirements is demonstrated. Applicable LORS are summarized in a table at the end of this regulatory setting. The table also identifies the specific sections in the AFC that demonstrate compliance.

6.2.5.1 Laws, Ordinances, Regulations and Standards (LORS)

Each level of government has adopted specific regulations that limit emissions from electrical power generation facilities and are applicable to this Project. The agencies with air quality permitting authority for this Project are shown in Table 6.2-16. The authority, purpose, and administering agency for each of these are discussed in more detail below.

TABLE 6.2-16
AIR QUALITY AGENCIES

AGENCY	AUTHORITY	CONTACT
U.S. EPA Region IX	PSD permit issuance, enforcement	Gerardo Rios, Chief Permits Office U.S. EPA Region IX 75 Hawthorne Street San Francisco, CA 94105 (415) 744-1259
California Air Resources Board	Regulatory oversight	Ray Menebroker, Chief Project Assessment Branch California Air Resources Board 2020 L Street Sacramento, CA 95814 (916) 322-6026
San Luis Obispo County Air Pollution Control District	Permit issuance, enforcement	Robert W. Carr Air Pollution Control Officer San Luis Obispo County Air Pollution Control District 2156 Sierra Way, Suite B San Luis Obispo, CA 93401 (805) 781-5912

An application for a Determination of Compliance will be filed with the District within approximately one week of filing the AFC. An application for a PSD permit will be filed with EPA Region IX at approximately the same time.

6.2.5.1.1 Federal

The EPA implements and enforces the requirements of many of the federal environmental laws. EPA Region IX, which has its offices in San Francisco, administers EPA programs in California. The federal Clean Air Act, as most recently amended in 1990, provides EPA with the legal authority to regulate air pollution from stationary sources such as MBPP. EPA has promulgated the following stationary source regulatory programs to implement the requirements of the 1990 Clean Air Act:

- Standards of Performance for New Stationary Sources (NSPS)
- National Emission Standards for Hazardous Air Pollutants (NESHAPS)
- Prevention of Significant Deterioration (PSD)
- New Source Review (NSR)

- Title IV: Acid Deposition Control
- Title V: Operating Permits

National Standards of Performance for New Stationary Sources

Authority: Clean Air Act '111, 42 USC '7411; 40 CFR Part 60, Subpart GG

Purpose: Establishes standards of performance to limit the emission of criteria pollutants (air pollutants for which EPA has established national ambient air quality standards (NAAQS)) from new or modified facilities in specific source categories. The applicability of these regulations depends on the equipment size; process rate; and/or the date of construction, modification, or reconstruction of the affected facility. Only the Standards of Performance for Stationary Gas Turbines, which limit NOx and SO_2 emissions from subject equipment, are applicable to the Project. These standards are implemented at the local level with federal and state oversight.

Administering Agency: San Luis Obispo County Air Pollution Control District (SLOCAPCD), with EPA Region IX and CARB oversight.

National Emission Standards for Hazardous Air Pollutants

Authority: Clean Air Act ' 112, 42 USC '7412; 40 CFR Part 63

Purpose: Establishes national emission standards to limit emissions of hazardous air pollutants (HAPs, or air pollutants identified by EPA as causing or contributing to the adverse health effects of air pollution but for which NAAQS have not been established) from facilities in specific source categories. Requires the use of maximum achievable control technology (MACT) for major sources of HAPs that are not specifically regulated or exempted under Part 63. Standards are implemented at the local level with federal oversight. NESHAPS promulgated pursuant to Section 112 of the Clean Air Act are not applicable to the Project because no specific standards have been established and the facility is not a major source of HAPs; thus NESHAPs requirements will not be addressed further.

Prevention of Significant Deterioration Program

Authority: Clean Air Act '160-169A, 42 USC '7470-7491; 40 CFR Parts 51 and 52

Purpose: Requires preconstruction review and permitting of new or modified major stationary sources of air pollution to prevent significant deterioration of ambient air quality. Prevention of Significant Deterioration (PSD) applies to pollutants for which ambient concentrations do not exceed the corresponding NAAQS (i.e., attainment pollutants). The PSD program allows new sources of air pollution to be constructed, or existing sources to be modified, while preserving the existing ambient air quality levels, protecting public health and welfare, and protecting Class I areas (e.g., national parks and wilderness areas).

<u>Administering Agency</u>: EPA Region IX.

New Source Review

<u>Authority</u>: Clean Air Act '171-193, 42 USC '7501 et seq.; 40 CFR Parts 51 and 52

<u>Purpose</u>: Requires preconstruction review and permitting of new or modified major stationary sources of air pollution to allow industrial growth without interfering with the attainment and maintenance of ambient quality standards. This program is implemented at the local level with EPA oversight.

<u>Administering Agency</u>: SLOCAPCD, with EPA Region IX oversight.

Title IV - Acid Rain Program

<u>Authority</u>: Clean Air Act '401, 42 USC '7651 et seq.; 40 CFR Part 72

<u>Purpose</u>: Requires the reduction of emissions of acidic compounds and their precursors. The principal source of these compounds is the combustion of fossil fuels. Therefore, Title IV established national standards to limit SO_2 and NOx emissions from electrical power generating facilities. These standards are implemented at the local level with federal oversight.

<u>Administering Agency</u>: SLOCAPCD, with EPA Region IX oversight.

Title V - Operating Permits Program

<u>Authority</u>: Clean Air Act ' 501 (Title V), 42 USC '7661; 40 CFR Part 70

<u>Purpose</u>: Requires the issuance of operating permits that identify all applicable federal performance, operating, monitoring, recordkeeping, and reporting requirements. Title V applies to major facilities, Phase II acid rain facilities, subject solid waste incinerator facilities, and any facility listed by EPA as requiring a Title V permit. These requirements are implemented at the local level with federal oversight.

<u>Administering Agency</u>: SLOCAPCD, with EPA Region IX oversight.

6.2.5.1.2 State

The ARB was created in 1968 by the Mulford-Carrell Air Resources Act, through the merger of two other state agencies. ARB's primary responsibilities are to develop, adopt, implement, and enforce the state's motor vehicle pollution control program; to administer and coordinate the state's air pollution research program; to adopt and update, as necessary, the state's ambient air quality standards; to review the operations of the local air pollution control districts; and to review and coordinate preparation of the State Implementation Plan (SIP) for achievement of the federal ambient air quality standards.

State Implementation Plan

<u>Authority</u>: Health & Safety Code (H&SC) '39500 et seq.

<u>Purpose</u>: Required by the federal Clean Air Act, the SIP must demonstrate the means by which all areas of the state will attain and maintain NAAQS within the federally mandated deadlines. ARB reviews and coordinates preparation of the SIP. Local districts must adopt new rules (and/or revise existing rules) and demonstrate that the resulting emission reductions, in conjunction with reductions in mobile source emissions, will result in the attainment of NAAQS. The relevant SLOCAPCD Rules and Regulations that have also been incorporated into the SIP are discussed with the local LORS.

<u>Administering Agency</u>: SLOCAPCD, with ARB and EPA Region IX oversight.

California Clean Air Act

<u>Authority</u>: H&SC '40910 - 40930

<u>Purpose</u>: Established in 1989, the California Clean Air Act requires local districts to attain and maintain both national and state ambient air quality standards at the "earliest practicable date." Local districts must prepare air quality plans demonstrating the means by which the ambient air quality standards will be attained and maintained. The SLOCAPCD Air Quality Plan is discussed with the local LORS.

<u>Administering Agency</u>: SLOCAPCD, with ARB oversight.

Toxic Air Contaminant Program

<u>Authority</u>: H&SC '39650 - 39675

<u>Purpose</u>: Established in 1983, the Toxic Air Contaminant Identification and Control Act created a two-step process to identify toxic air contaminants and control their emissions. ARB identifies and prioritizes the pollutants to be considered for identification as toxic air contaminants. ARB assesses the potential for human exposure to a substance, while the Office of Environmental Health Hazard Assessment evaluates the corresponding health effects. Both agencies collaborate in the preparation of a risk assessment report, which concludes whether a substance poses a significant health risk and should be identified as a toxic air contaminant. In 1993, the Legislature amended the program to identify the 189 federal hazardous air pollutants as toxic air contaminants. ARB reviews the emission sources of an identified toxic air contaminant and, if necessary, develops air toxics control measures to reduce the emissions. There have been no measures adopted via the Toxic Air Contaminant Program that are applicable to the Project.

Air Toxic "Hot Spots" Act

Authority: CA Health & Safety Code ' 44300-44384; 17 CCR '93300-93347

Purpose: Established in 1987, the Air Toxics "Hot Spots" Information and Assessment Act supplements the toxic air contaminant program, by requiring the development of a statewide inventory of air toxics emissions from stationary sources. The program requires affected facilities to prepare (1) an emissions inventory plan that identifies relevant air toxics and sources of air toxics emissions; (2) an emissions inventory report quantifying air toxics emissions; and (3) a health risk assessment, if necessary, to characterize the health risks to the exposed public. Facilities whose air toxics emissions are deemed to pose a significant health risk must issue notices to the exposed population. In 1992, the Legislature amended the program to further require facilities whose air toxics emissions are deemed to pose a significant health risk to implement risk management plans to reduce the associated health risks. This program is implemented at the local level with state oversight.

Administering Agency: SLOCAPCD, with ARB oversight.

CEC and ARB Memorandum of Understanding

Authority: CA Pub. Res. Code ' 25523(a); 20 CCR '1752, 1752.5, 2300-2309, and Div. 2, Chap. 5, Art. 1, Appendix B, Part (k)

Purpose: Establishes requirements in the CEC=s decision-making process on an application for certification that assure protection of environmental quality.

Administering Agency: California Energy Commission.

6.2.5.1.3 Local

When the state's air pollution statutes were reorganized in the mid-1960s, local districts were required to be established in each county of the state. There are three different types of districts: county (including the SLOAPCD), regional, and unified. Local districts have principal responsibility for developing plans for meeting the NAAQS and California ambient air quality standards; for developing control measures for nonvehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards; for implementing permit programs established for the construction, modification, and operation of sources of air pollution; for enforcing air pollution statutes and regulations governing nonvehicular sources; and for developing programs to reduce emissions from indirect sources.

San Luis Obispo County Air Pollution Control District Clean Air Plan

Authority: H&SC '40914

Purpose: The SLOCAPCD plan defines the proposed strategies, including stationary source and transportation control measures and new source review rules, whose implementation will attain and maintain the state ambient air quality standards. The relevant stationary source control measures and new source review requirements are discussed with SLOCAPCD Rules and Regulations.

Administering Agency: SLOCAPCD, with ARB oversight.

San Luis Obispo County Air Pollution Control District Rules and Regulations

Authority: H&SC '4000 et seq., H&SC '40200 et seq., indicated SLOCAPCD Rules

Purpose: Establishes procedures and standards for issuing permits; establishes standards and limitations on a source-specific basis.

Administering Agency: SLOCAPCD with EPA and ARB oversight.

6.2.5.2 Summary of Applicable Requirements

This section summarizes applicable federal, state, and local air pollution requirements.

6.2.5.2.1 Authority to Construct

Rule 201 (Permits) specifies that any facility installing nonexempt equipment that causes or controls the emission of air pollutants must first obtain an Authority to Construct from the SLOCAPCD. Under Rule 223 (Power Plants), the Commission Decision acts as an authority to construct for a power plant.

6.2.5.2.2 Review of New or Modified Sources

Rule 204 (Requirements) implements the federal NSR program, as well as the new source review requirements of the California Clean Air Act. The rule contains the following elements:

- Best available control technology (BACT);
- Emission offsets; and
- Air quality impact analysis (AQIA).

Best Available Control Technology

BACT must be applied to any new or modified source resulting in an emissions increase exceeding any SLOCAPCD BACT threshold shown in Table 6.2-17. Reasonably available control technology (RACT) must be applied to any new or modified source resulting in an emissions increase not exceeding any of the indicated BACT thresholds.

TABLE 6.2-17
SLOCAPCD BACT EMISSION THRESHOLDS

POLLUTANT	THRESHOLD (lb/day)
PM	25
NOx	25
SO_2	25
VOC	25
CO	250

The SLOCAPCD defines BACT as the most stringent emission limitation or control technique that:

- has been achieved in practice for such permit unit category or class of source; or
- is contained in any approved state implementation plan for such permit unit category or class of source. A specific limitation or control technique shall not apply if the owner or operator of the proposed permit unit demonstrates to the satisfaction of the air Pollution Control Officer that such limitation or control technique is not presently achievable; or
- is any other emission limitation or control technique, including process and equipment changes of basic and control equipment, found by the air Pollution control Officer to be technologically feasible for such class or category of sources or for a specific source, and cost-effective as compared to measures listed in the Clean Air Plant or rules adopted by the Board.

The SLOCAPCD defines RACT as the lowest emission limit achievable through the application of control technology that is reasonably available, considering technological and economic feasibility.

Emission Offsets

A new or modified facility with emissions exceeding the SLOCAPCD offset thresholds shown in Table 6.2-18 must offset all emissions increases at a 1:1 ratio.

TABLE 6.2-18
SLOCAPCD OFFSET EMISSION THRESHOLDS

POLLUTANT	THRESHOLD (tpy)
PM_{10}	25
NOx	25
SO_2	25
VOC	25
CO	250

Air Quality Impact Analysis

An air quality impact analysis must be conducted to evaluate impacts of emission increases from new or modified facilities on ambient air quality. Project emissions must not cause an exceedance of any ambient air quality standard.

Toxics New Source Review

Rule 219 provides a mechanism for evaluating potential impacts of air emissions of toxic substances from new, modified and relocated sources in the SLOCAPCD. The rule requires a demonstration that the source will not adversely impact the health and welfare of the public.

CEC Review

Rule 223 establishes a procedure for coordinating SLOCAPCD review of power plant projects with the CEC AFC process. Under Rule 223, the SLOCAPCD reviews the AFC and issues a Determination of Compliance for a proposed project, which is equivalent to an Authority to Construct. A permit to operate is issued following the CEC's certification of a project.

6.2.5.2.3 Prevention of Significant Deterioration

The PSD requirements apply, on a pollutant-specific basis, to any project that is a new major stationary source or a major modification to an existing major stationary source. A major source is a listed facility (one of 28 PSD source categories listed in the federal Clean Air Act) that emits at least 100 tpy or any facility that emits at least 250 tpy. A modified major source is subject to PSD if the cumulative emission increase since the applicable PSD baseline dates exceeds the PSD thresholds shown in Table 6.2-19.

TABLE 6.2-19
PSD EMISSION THRESHOLDS FOR A MAJOR MODIFICATION

POLLUTANT	THRESHOLD (tpy)
PM_{10}	15
NOx	40
SO_2	40
VOC	40
CO	100

The PSD program contains the following elements:

- Air quality monitoring;
- BACT;
- Air quality impact analysis;
- Protection of Class I areas; and
- Visibility, soils, and vegetation impacts.

Air Quality Monitoring

EPA may, at its discretion, require preconstruction and/or post-construction ambient air quality monitoring. Preconstruction monitoring data must be gathered over a one-year period to characterize local ambient air quality. Post-construction air quality monitoring data must be collected as deemed necessary by EPA to characterize the impacts of project emissions on ambient air quality.

Best Available Control Technology

BACT must be applied to any modified major source to minimize the emissions of those pollutants exceeding the PSD emission thresholds. EPA defines BACT as an emissions limitation based on the maximum degree of reduction for each subject pollutant, considering energy, environmental, and economic impacts, that is achievable through the application of available methods, systems, and techniques. BACT must be as stringent as any emission limit required by an applicable NSPS or NESHAP.

Air Quality Impact Analysis

An air quality dispersion analysis must be conducted to evaluate impacts of significant emission increases from new or modified facilities on ambient air quality. Project emissions must not cause an exceedance of any ambient air quality standards, and the increase in ambient air concentrations must not exceed the allowable increments shown in Table 6.2-20.

TABLE 6.2-20
PSD CLASS II INCREMENTS

POLLUTANT	AVERAGING PERIOD	ALLOWABLE INCREMENT (ug/m^3)
PM_{10}	Annual 24-Hour	17 30
NOx	Annual	25
SO_2	Annual 24-Hour 3-Hour	20 91 512

Protection of Class I Areas

The increase in ambient air quality concentrations for the relevant pollutants (i.e., NOx, PM_{10}, SO_2, TSP, or ROGs) within Class I locations must be characterized if there is a significant emission increase associated with the new or modified source.

Visibility, Soils, and Vegetation Impacts

Impairment to visibility, soils, and vegetation resulting from Project emissions as well as associated commercial, residential, industrial, and other growth must be analyzed. Cumulative impacts to local ambient air quality must also be analyzed.

6.2.5.2.4 Acid Rain Permit

Rule 217 (Federal Part 72 Permits) requires that a subject facility comply with maximum operating emissions levels for SO_2 and NOx, and must monitor SO_2, NOx, and CO_2 emissions and exhaust gas flow rates. A Phase II acid rain facility, such as MBPP, must also obtain an acid rain permit as mandated by Title IV of the 1990 Clean Air Act Amendments. A permit application must be submitted to the SLOCAPCD at least 24 months before operation of the new unit commences. The application must present all relevant Phase II sources at the facility, a compliance plan for each unit, applicable standards, and an estimated commencement date of operations.

6.2.5.2.5 Federal Operating Permit

Rule 216 (Federal Part 70 Permits) requires major facilities and Phase II acid rain facilities undergoing modifications to obtain an operating permit containing the federally enforceable requirements mandated by Title V of the 1990 Clean Air Act Amendments. A permit application for a modification to an existing facility must be submitted to the SLOCAPCD, and a revised Title V permit issued, prior to operation of the modified facility. The application must present a process description, all stationary sources at the facility, applicable regulations, estimated emissions, associated operating conditions, alternative operating scenarios, a facility compliance plan, and a compliance certification.

6.2.5.2.6 New Source Performance Standards

Rule 601 (New Source Performance Standards) requires compliance with applicable federal standards of performance for new or modified stationary sources.

Subpart GG (Standards of Performance for Stationary Gas Turbines) applies to gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (Gj/hr) (10.15 MMBtu/hr) at higher heating value. The proposed new turbines at MBPP have hourly heat input that exceed this threshold. The NSPS NOx emission limit is defined by the following equation:

$$STD = \frac{0.0150\ (14.4)}{Y} + F$$

where:

	STD	=	allowable NOx emissions (percent by volume at 15% O_2 on a dry basis)
	Y	=	manufacturer's rated heat rate at peak load (kilojoules per watt hour)
	F	=	NOx emission allowance for fuel-bound nitrogen (assumed to be zero for natural gas)

Subpart Da (Standards of Performance for Electric Utility Steam Generating Units) applies to electric utility boilers and steam generating units that are capable of combusting more than 250 MMBtu per hour of fossil fuel. The maximum duct burner heat input exceeds this threshold. Subpart Da contains emissions standards for particulate matter, SO_2, and NOx from these units.

6.2.5.2.7 SLOCAPCD Prohibitory Rules

The general prohibitory rules of the SLOCAPCD applicable to the MBPP Project include the following:

- Rule 401 – Visible Emissions: Prohibits visible emissions as dark or darker than Ringelmann No. 2 for periods greater than three minutes in any hour.
- Rule 402 – Nuisance: Prohibits the discharge from a facility of air pollutants that cause injury, detriment, nuisance, or annoyance to the public, or that damage business or property.
- Rule 403 – Particulate Matter Emission Standards: Prohibits PM emissions in excess of 10 lb/hr or 0.3 grains per dry standard cubic foot (gr/dscf).
- Rule 404 – Sulfur Compounds Emission Standards, Limitations, and Prohibitions: Prohibits sulfur compound emissions, calculated as SO_2, in excess of 200 lb/hr or 0.2% (2,000 ppm) from any source. The maximum exhaust SO_2 emission rate (1.12 lb/hr) and concentration (0.12 ppm) will be well below the Rule 404 SO_2 emission limits. This rule also prohibits the burning of any gaseous fuel containing sulfur compounds, calculated as hydrogen sulfide, in excess of 0.5 gr/dscf of fuel.
- Rule 405 – Nitrogen Oxides Emission Standards, Limitations, and Prohibitions: Prohibits emissions of NOx (calculated as NO_2) in excess of 140 lb/hr.
- Rule 406 – Carbon Monoxide Emission Standards and Limitations: Prohibits CO emissions in excess of 2,000 ppm from any source.
- Rule 429 – Oxides of Nitrogen and Carbon Monoxide Emissions from Electric Power Generation Boilers: Limits NOx and CO emissions from and phases out fuel oil use in electric power generation boilers.

TABLE 6.2-21
LAWS, ORDINANCES, REGULATIONS, STANDARDS (LORS), AND PERMITS FOR PROTECTION OF AIR QUALITY

LORS	PURPOSE	REGULATING AGENCY	PERMIT OR APPROVAL	SCHEDULE AND STATUS OF PERMIT	CONFORMANCE (SECTION)
Federal					
Clean Air Act (CAA) §160-169A and implementing regulations, Title 42 United States Code (USC) §7470-7491 (42 USC §7470-7491), Title 40 Code of Federal Regulations (CFR) Parts 51 & 52 (40 CFR Parts 51 & 52). (Prevention of Significant Deterioration Program)	Requires prevention of significant deterioration (PSD) review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies to pollutants for which ambient concentrations are lower than NAAQS.	EPA	Issues Prevention of Significant Deterioration Permit for a Major Modification to an Existing Major Source.	Permit to be obtained before start of construction.	6.2.6.3.3, 6.2.6.5, 6.2.7.1 Pages 6.2-60 – 66, 6.2-68– 70, 6.2-71 – 73
CAA §171-193, 42 USC §7501 et seq. (New Source Review)	Requires new source review (NSR) facility permitting for construction or modification of specified stationary sources. NSR applies to pollutants for which ambient concentration levels are higher than NAAQS.	SLOCAPCD with EPA oversight	After project review, issues DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	6.2.6.3.2, 6.2.7.3 Pages 6.2-55 – 59, 6.2-73– 78
CAA §401 (Title IV), 42 USC §7651 (Acid Rain Program)	Requires reductions in NOx and SO_2 emissions.	SLOAPCD with EPA oversight	Issues Acid Rain permit after review of application.	Permit to be obtained prior to commencement of operation	6.2.7.3 Page 6.2-77
CAA §501 (Title V), 42 USC §7661 (Federal Operating Permits Program)	Establishes comprehensive permit program for major stationary sources.	SLOCAPCD with EPA oversight	Issues Title V permit after review of application.	Permit to be obtained prior to commencement of construction.	6.2.7.3 Page 6.2-77
CAA §111, 42 USC §7411, 40 CFR Part 60 (New Source Performance Standards – NSPS)	Establishes national standards of performance for new stationary sources.	SLOCAPCD with EPA oversight	After project review, issues DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	6.2.7.3 Page 6.2-78

TABLE 6.2-21
LAWS, ORDINANCES, REGULATIONS, STANDARDS (LORS), AND PERMITS FOR PROTECTION OF AIR QUALITY

LORS	PURPOSE	REGULATING AGENCY	PERMIT OR APPROVAL	SCHEDULE AND STATUS OF PERMIT	CONFORMANCE (SECTION)
State					
H&SC §44300-44384; California Code of Regulations (CCR) §93300-93347 (Toxic "Hot Spots" Act)	Requires preparation and biennial updating of facility emission inventory of hazardous substances; risk assessments.	SLOCAPCD with CARB oversight	After project review, issues DOC with conditions limiting emissions.	Screening HRA submitted as part of AFC.	6.2.6.4 Pages 6.2-66 – 67
California Public Resources Code §25523(a); 20 CCR §§1752, 2300-2309 (CEC & CARB Memorandum of Understanding)	Requires that CEC's decision on AFC include requirements to assure protection of environmental quality; AFC required to address air quality protection.	CEC	After project review, issues Final Certification with conditions limiting emissions.	SLOCAPCD approval of AFC, i.e., DOC, to be obtained prior to CEC approval.	6.2.7.3 Page 6.2-73
Local					
SLOAPCD Rule 204 (Review of New or Modified Sources)	NSR: Requires that preconstruction review be conducted for all proposed new or modified sources of air pollution, including BACT, emissions offsets, and air quality impact analysis.	SLOCAPCD with ARB oversight	After project review, issues DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	6.2.6.3.2, 6.2.7.3 Pages 6.2-57 – 60, 6.2-73—78
SLOCAPCD Rule 216 (Federal Operating Permits)	Implements operating permits requirements of CAA Title V.	SLOCAPCD with EPA oversight	Issues Title V permit after review of application.	Agency approval to be obtained before start of construction.	6.2.7.3 Page 6.2-77
SLOCAPCD Rule 217 (Acid Deposition Control)	Implements acid rain regulations of CAA Title IV.	SLOCAPCD with EPA oversight	Issues Title IV permit after review of application.	Application to be made within 12 months of start of facility operation.	6.2.7.3 Page 6.2-77
SLOCAPCD Rule 219 (Toxics New Source Review)	Requires risk assessments for all proposed new or modified sources of toxic air contaminants.	SLOCAPCD	After project review, issues DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	6.2.6.4.2, App. 6.2-4 Pages 6.2-67 – 68
SLOCAPCD Rule 401 (Visible Emissions)	Limits visible emissions to no darker than Ringelmann No. 2 for periods greater than 3 minutes in any hour.	SLOCAPCD with ARB oversight	After project review, issues DOC with conditions limiting emissions.	Agency approval to be obtained prior to commencement of operation.	6.2.7.3 Page 6.2-78

TABLE 6.2-21
LAWS, ORDINANCES, REGULATIONS, STANDARDS (LORS), AND PERMITS FOR PROTECTION OF AIR QUALITY

LORS	PURPOSE	REGULATING AGENCY	PERMIT OR APPROVAL	SCHEDULE AND STATUS OF PERMIT	CONFORMANCE (SECTION)
SLOCAPCD Rule 402 (Public Nuisance)	Prohibits emissions in quantities that adversely affect public health, other businesses, or property.	SLOCAPCD with ARB oversight	After project review, issues DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	6.2.7.3 Page 6.2-78
SLOCAPCD Rule 403 (Particulate Matter)	Limits PM emissions from stationary sources.	SLOCAPCD with ARB oversight	After project review, issues DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	6.2.7.3 Page 6.2-78
SLOCAPCD Rule 404 (Sulfur Compounds Emissions)	Limits SO_2 emissions from stationary sources.	SLOCAPCD with ARB oversight	After project review, issues DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	6.2.7.3 Page 6.2-78
SLOCAPCD Rule 405 (Nitrogen Oxides)	Limits NOx emissions from stationary sources.	SLOCAPCD with ARB oversight	After project review, issues DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	6.2.7.3 Page 6.2-78
SLOCAPCD Rule 406 (Carbon Monoxide)	Limits CO emissions from stationary sources.	SLOCAPCD with ARB oversight	After project review, issues DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	6.2.7.3 Page 6.2-78
SLOCAPCD Rule 429 (Emissions from Electric Power Generation Boilers)	Limits NOx, CO, and ammonia emissions from electric power generation boilers.	SLOCAPCD with ARB oversight	After project review, issues DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	6.2.7.3 Page 6.2-78
SLOCAPCD Rule 601 (New Source Performance Standards,: 40 CFR 60, Subpart GG, Stationary Gas Turbines; Subpart Da,Utility Boilers)	Requires monitoring of fuel, other operating parameters; limits NOx and SO_2 and PM emissions, requires source testing, emissions monitoring, and recordkeeping.	SLOCAPCD with ARB oversight	After project review, issues DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	6.2.7.3 Page 6.2-78

6.2.6 IMPACTS

6.2.6.1 Overview of the Analytical Approach to Estimating Facility Impacts

The facility is subject to SLOCAPCD Rules 202 and 204, which contain the District's New Source Review (NSR) and permitting requirements, and to the requirements of 40 CFR 52.21. As discussed in Section 6.2.5 of the application, the federal EPA retains the authority for issuing PSD permits for projects in the SLOCAPCD.

The District NSR regulation requires that BACT be used, emission offsets be provided, and an air quality impact analysis be performed. Similarly, the federal PSD regulation requires the use of BACT, and various analyses of the air quality impacts of the proposed Project. Ambient air quality impact analyses have been conducted to satisfy District and EPA requirements, as well as CEC requirements, for criteria pollutants (NO_2, CO, PM_{10}, and SO_2), noncriteria pollutants, and construction impacts. The applicability of the District regulatory requirements and facility compliance with these requirements are based on facility emission levels and ambient air quality impact analyses.

Maximum pollutant emission rates and ambient impacts of the Project have been evaluated to determine compliance with District and federal regulations. Emissions sources include four new gas turbines and four fired heat recovery steam generators (HRSGs). The four existing boilers at the facility will be retired after startup of the new units. Actual operation of the turbines will range between 50% and 100% of maximum rated output. Emission control systems will be fully operational except during startups and shutdowns. Maximum annual emissions are based on operation of the facility at maximum firing rates, and include the expected maximum hours of startups and shutdowns that may occur in a year. Each turbine startup will result in transient emission rates until steady-state operation for the gas turbine and emission control systems is achieved.

The criteria pollutant ambient impact analyses use pollutant-specific maximum hourly, daily, and annual emission rates from the facility. This allows calculation of maximum ambient impacts for each pollutant and averaging period. The following sections describe the emission sources that have been evaluated for the facility, the analyses of ambient impacts, and the evaluation of facility compliance with the applicable air quality regulations.

6.2.6.2 Facility Emissions

6.2.6.2.1 Reductions in Emissions from the Existing Facility

MBPP consists of four utility boilers: Units 1 and 2, which are rated at 170 MW (gross) each; and Units 3 and 4, which are rated at 345 MW (gross) each. All four units will be shut down once the new turbines are operational, resulting in emissions reductions. Emissions reductions are calculated differently under District and federal regulations and for CEQA purposes. Each approach is discussed separately below.

District Regulations

Under the District's new source review regulation, emissions increases and reductions are calculated separately, and the reductions are used as emission reduction credits (ERCs) to offset all emissions increases. Credits for the shutdown of the boilers are determined using the actual emissions from the units over a representative three-year period, adjusted to reflect best available retrofit control technology (BARCT). The most recent three-year period (August 1997 through July 2000) has been proposed as the appropriate baseline period for this calculation. The District has determined that BARCT for Units 1 and 2 is a NOx emission rate of 30 ppm, corrected to 3% O_2, while BARCT for Units 3 and 4 is a NOx emission rate of 10 ppm, corrected to 3% O_2. The calculation of the baseline emissions for the boilers is shown in Appendix 6.2-1, Attachment 6.2-1.1, and in Tables 6.2-1.1 and 1.2. The results of the calculations are summarized in Table 6.2-22.

TABLE 6.2-22
CREDITABLE EMISSIONS REDUCTIONS
UNDER DISTRICT RULE 213
MORRO BAY POWER PLANT[1]

	EMISSIONS, tons per year				
	NOx	SO_2	CO	VOC	PM_{10}
Unit 1	51.1	0.82	57.1	7.5	10.4
Unit 2	60.0	0.97	18.8	8.9	12.2
Unit 3	65.6	3.17	539.5	29.1	40.2
Unit 4	69.1	3.34	532.6	30.6	42.3
Total Baseline	245.7	8.31	1,147.9	76.1	105.2
Total Creditable Reductions[2]	245.7	6.64	918.3	60.9	84.2

(1) NOx emissions adjusted for BARCT (see text); CO from CEMS; SO_2 from mass balance; VOC and PM_{10} from AP-42 emission factors.
(2) Some discounting required to calculate creditable ERCs. See Section 6.2.7.3.2.

Federal Regulations

Under federal PSD regulations, the potential to emit for the Project is compared with the actual emissions from the existing emissions units to be modified. In this case, the existing units to be "modified" are Units 1, 2, 3, and 4, which will be shut down. Federal regulations generally define actual emissions as the average emission rate over the two years preceding the date of application that is representative of normal source operation. Therefore, the most recent 24 months of operation (August 1998 through July 2000) have been used to calculate actual emissions. Fuel use and generation data for the existing boilers during the past 24 months are shown in Appendix 6.2-1, Table 6.2-1.1.

As the boilers are being shut down, their creditable emissions reductions are equal to the actual emissions during the baseline period. Federal regulations do not require adjustments of the baseline emissions for BARCT. Calculation of actual emissions during the baseline period is shown in detail in Appendix 6.2-1, Attachment 6.2-1.1. Actual emissions for Units 1, 2, 3, and 4 are summarized in Table 6.2-23 below.

CEQA

For CEQA purposes, the calculation of emissions reductions from the shutdown of the existing boilers is based on a comparison of historical and projected future emissions. Historical emissions during the baseline period for each of the units are the same as those calculated for the PSD evaluation above. Projected future emissions from the boilers, after they have been shut down, are zero. The CEQA baseline for the Project is also shown in Table 6.2-23 below.

TABLE 6.2-23
CALCULATION OF BOILER EMISSIONS
UNDER 40 CFR 52.21 AND CEQA
MORRO BAY POWER PLANT[1]

	EMISSIONS, tons per year				
	NOx	SO_2	CO	VOC	PM_{10}
Actual Emissions (Baseline)					
Unit 1	193.3	1.1	80.0	10.3	14.2
Unit 2	273.5	1.3	24.8	12.2	16.8
Unit 3	170.9	3.7	644.7	33.9	46.9
Unit 4	217.7	3.9	686.5	35.7	49.3
Total	855.4	10.0	1,436.0	92.1	127.2

(1) NOx and CO from CEMS; SO_2 from mass balance; VOC and PM_{10} from AP-42 emission factors.

6.2.6.2.2 New Equipment

As discussed in Section 2 of the AFC, the new equipment will consist of four GE Model 7251FA combustion turbines with duct burners, each rated at 300 megawatts (MW) (net, nominal, at site design conditions, including steam turbine output). Natural gas will be the only fuel used at the facility. Typical specifications for natural gas fuel are shown in Table 6.2-24.

TABLE 6.2-24
TYPICAL NATURAL GAS ANALYSIS
MORRO BAY POWER PLANT

PARAMETER	VALUE
Carbon Dioxide	1.296%
Nitrogen	0.541%
Methane	95.846
Ethane	1.889
Propane	0.307
Iso-Butane	0.035
N-Butane	0.043
Iso-Pentane	0.013
N-Pentane	0.010
Hexane and higher	0.020
Sulfur Content	less than 0.25 gr/dscf
High Heating Value (HHV)	1022 Btu/ft^3 22,412 Btu/lb

Fuel combustion results in the formation of NOx, SO_2, unburned hydrocarbons (VOC), PM_{10}, and CO. The combustion turbines will be equipped with dry low-NOx combustors that act to minimize the formation of NOx and CO. To further reduce gas turbine NOx, selective catalytic reduction (SCR) control systems will be provided. To maintain low CO emissions, oxidation catalyst systems will be installed. Ammonia (NH_3) will be used in the SCR system; therefore, unreacted NH_3 emissions have also been analyzed. Because natural gas is a clean burning fuel, there will be minimal formation of combustion PM_{10} and SO_2.

Criteria Pollutant Emissions

Gas turbine and duct burner emission rates have been estimated from vendor data, facility design criteria, and established emission calculation procedures. Maximum emission rates for the combustion turbines alone are shown in Table 6.2-25; emission rates for the combustion turbines with duct burning are shown in Table 6.2-26. Emission rates and heat iput at minimum and maximum nominal loads and ambient temperatures are shown in Appendix 6.2-1, Table 6.2-1.3.

TABLE 6.2-25
EMISSIONS FROM COMBUSTION TURBINES[1]

Pollutant	ppmvd @ 15% O_2	lb/MMBtu	lb/hr
NOx	2.50[2]	0.0092	16.72
CO	6.00[2]	0.0132	24.41
VOC	2.0[2]	0.0015	2.71
PM_{10}[3,4]	0.0028 gr/dscf	0.00102	11.0
SO_2[5]	0.14	0.0007	1.30

TABLE 6.2-26
EMISSIONS FROM COMBUSTION TURBINES WITH DUCT BURNING[1]

Pollutant	ppmvd @ 15% O_2	lb/MMBtu	lb/hr
NOx	2.50[2]	0.009	19.32
CO	6.00[2]	0.0132	28.26
VOC	2.0[2]	0.0015	5.39
PM_{10}[3,4]	0.0023 gr/dscf	0.0064	13.3
SO_2[5]	0.14	0.0007	1.50

(1) Emission rates shown reflect the highest value at any operating load.
(2) Duke Energy design criteria.
(3) Emission rate provided by vendor. Concentration and emission factor calculated from emission rate.
(4) 100 percent of particulate matter emissions assumed to be emitted as PM_{10}; PM_{10} emissions include both front and back half.
(5) Based on expected fuel sulfur content of 0.25 gr/100 scf fuel.

Maximum emission rates expected to occur during startup and shutdown are shown in Table 6.2-27. PM_{10} and SO_2 emissions have not been included in this table because emissions of these pollutants will be lower during startup and shutdown periods than during baseload facility operation.

TABLE 6.2-27
FACILITY STARTUP/SHUTDOWN EMISSION RATES[1]
MORRO BAY POWER PLANT

	NOx	CO	VOC
Startup/Shutdown, lb/hour	80	620	16
Startup/Shutdown, lb/start[2]	320	2,480	64

(1) Estimated based on vendor data and source test data. See Appendix 6.2-1, Tables 6.2-1.4a and 1.4b.
(2) Maximum of four hours per start.

The maximum firing rate of the gas turbines, daily and annual fuel consumption rates, and operating restrictions are used to calculate maximum potential hourly, daily, and annual emissions for each pollutant. The maximum heat input rates (fuel consumption rates) for the gas turbines are shown in Table 6.2-28. These are based on a maximum of 8,400 operating hours per year, per turbine; the turbine will be in startup and/or shutdown mode for up to 400 of these hours. Calculations are shown in Appendix 6.2-1, Table 6.2-1.5.

TABLE 6.2-28
MAXIMUM TURBINE HEAT INPUT RATES (HHV), NOT TO BE EXCEEDED[1]

PERIOD	TOTAL FUEL USE FOR FOUR TURBINES WITH DUCT FIRING		GAS TURBINE WITH DUCT FIRING, each		GAS TURBINES, each[1]	
Per Hour	8,564.8	MMBtu/hr	2,141.2	MMBtu/hr	1,850.4	MMBtu/hr
Per Day	196,250	MMBtu/day	34,259.2	MMBtu/day	14,803.2	MMBtu/day
Per Year	66,826,240	MMBtu/yr	8,564,800	MMBtu/yr	8,141,760	MMBtu/yr

(1) Based on maximum heat input for full load operation at 33 deg. F.

Maximum hourly, daily and annual emissions were determined by evaluating the following operating cases for hourly, daily, and annual operations.

Maximum Hourly Emissions:

- Two turbines are in startup mode.
- Two turbines operate at full load with duct firing.

Maximum Daily Emissions:

For NOx, CO, and VOC:

- Each turbine has four hours of startup.
- Each turbine operates at full load with duct firing for 16 hours.
- Each turbine operates at full load without duct firing for the remaining hours.

For SO_2 and PM_{10}:

- Each turbine operates at full load with duct firing for 16 hours.
- Each turbine operates at full load without duct firing for 8 hours.

Maximum Annual Emissions:

For NOx, CO, and VOC:

- Each turbine has 400 hours of startups per year.
- Each turbine operates at full load with duct firing for 4,000 hours.
- Each turbine operates at full load without duct firing for the remaining 4,000 hours.

For SO_2 and PM_{10}:

- Each turbine operates at full load with duct burning for 4,000 hours per year.
- Each turbine operates at full load without duct firing for 4,400 hours per year.

The maximum annual, daily, and hourly emissions for the new turbines are shown in Table 6.2-29. Detailed emission calculations appear in Appendix 6.2-1, Table 6.2-1.6.

TABLE 6.2-29
EMISSIONS FROM NEW TURBINES[1]

	NOx	SO_2	CO	VOC	PM_{10}
Maximum Hourly Emissions, lb/hr	198.6	5.8	1,296.5	42.8	53.2
Maximum Daily Emissions, lb/day	2,784.0	134.4	12,119.2	644.3	1203.2
Maximum Quarterly Emissions, tons/qtr	73.1	5.8	229.3	19.4	50.8
Maximum Annual Emissions, tpy	292.3	23.0	917.4	77.6	203.2

(1) Total, four turbines. See Appendix 6.2-1, Table 6.2-1.6 for calculations. Includes startup emissions.

Net Emissions Increase

As discussed above, the net emissions increase from the proposed modification is calculated differently for District and federal regulatory purposes and under CEQA. Under the District regulations, the net emissions increase is calculated as the sum of all of the increases in emissions from each emissions unit resulting from the Project. Since the only emissions units with an increase in emissions are the new turbines, the net emissions increase under District regulations is equal to the emissions from the new turbines, as shown in Table 6.2-30.

TABLE 6.2-30
NET EMISSIONS INCREASE UNDER DISTRICT RULE 213.D.2 (tons per year)

	NOx	SO_2	CO	VOC	PM_{10}
New Gas Turbines	292.3	23.0	917.4	77.6	203.2
Net Increase	292.3	23.0	917.4	77.6	203.2

For federal PSD and CEQA purposes, the net emissions increase is calculated as the difference between the actual emissions from the existing boilers and future emissions from the new turbines (from Table 6.2-29). This calculation is shown in Table 6.2-31 below.

TABLE 6.2-31
NET EMISSIONS INCREASE UNDER 40 CFR 52.21 AND CEQA
(tons per year)

	NOx	SO_2	CO	VOC	PM_{10}
New Gas Turbines	292.3	23.0	917.4	77.6	203.2
Total Baseline	855.4	10.0	1,436.0	92.1	127.2
Net Emissions Increase (Reduction)	(563.0)	13.0	(518.7)	(14.5)	76.0

Noncriteria Pollutant Emissions

Noncriteria pollutants are substances that have been identified as pollutants that may cause adverse human health effects. Nine of these pollutants are regulated under the federal New Source Review program: lead, asbestos, beryllium, mercury, fluorides, sulfuric acid mist, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds. In addition to these nine substances, EPA has listed 189 compounds as potential hazardous air pollutants (Clean Air Act Sec.112(b)(1)); many of these are also regulated under the California Air Toxics AHot Spots@ Act. Any pollutant that may be emitted from the facility and is on the federal New Source Review list, the federal Clean Air Act list, and/or the Toxics AHot Spots@ list has been evaluated. Emission factors were determined by reviewing the available technical data, determining the products of combustion, and/or using material balance calculations.

Noncriteria pollutant emission factors for existing equipment at the power plant were based on source testing and taken from the AB2588 health risk assessment (PG&E, 1991).* Emission factors for the new turbines were taken from source test data, from data compiled by the Ventura County APCD, and from the CATEF database. Appendix 6.2-1, Tables 6.2-1.7, 1.8 and 1.9 provide the detailed emission calculations for noncriteria pollutants. Noncriteria pollutant emissions from the boilers and turbines are summarized in Tables 6.2-32 and 6.2-33, respectively. As emissions of each individual HAP are below 10 tons per year and total HAP emissions are below 25 tons per year, the turbines are not subject to the MACT requirements of 40 CFR Part 63.

* Additional sources included in the screening health risk assessment consist of three Diesel-fueled fire pump engines, a Diesel-fueled emergency generator, gasoline storage and dispensing activities and boiler chemical charging.

TABLE 6.2-32
HISTORICAL ACTUAL NONCRITERIA POLLUTANT EMISSIONS FROM BOILERS
MORRO BAY POWER PLANT

POLLUTANT	BOILERS 1 AND 2 (TOTAL)		BOILER 3		BOILER 4	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
Benzene	4.03E-3	<0.01	4.14E-3	<0.01	4.14E-3	<0.01
Formaldehyde	4.23E-2	3.8E-2	4.35E-2	6.7E-2	4.35E-2	7.1E-2

Table 6.2-33
NONCRITERIA POLLUTANT EMISSIONS FROM NEW GAS TURBINES
MORRO BAY POWER PLANT

POLLUTANT	GAS TURBINES (each)		TOTAL, FOUR GAS TURBINES (ton/yr)
	lb/hr	ton/yr	
Acetaldehyde	0.14	0.56	2.24
Acrolein	1.35E-2	0.05	0.21
Ammonia (1)	14.3	60.1	240.4
Benzene	2.85E-2	0.11	0.44
1,3-Butadiene	2.66E-4	1.04E-3	4.15E-3
Ethylbenzene	3.75E-2	0.15	0.59
Formaldehyde	0.23	0.90	3.60
Naphthalene	3.48E-3	1.36E-2	5.43E-2
PAHs(2)	1.38E-3	5.39E-3	2.16E-2
Propylene Oxide	0.10	0.39	1.56
Toluene	0.15	0.58	2.32
Xylene	5.47E-2	0.21	0.85
Total HAPs		2.97	11.9

(1) Not a hazardous air pollutant (HAP) under CAA Section 112.
(2) Polycyclic aromatic hydrocarbons, excluding naphthalene (accounted for separately).

6.2.6.3 Air Quality Impact Analysis

6.2.6.3.1 Air Quality Modeling Methodology

An assessment of impacts on ambient air quality of the proposed facility has been conducted using EPA-approved air quality dispersion models. These models are based on fundamental mathematical descriptions of atmospheric processes in which a pollutant source can be related to a receptor area. The modeling protocol submitted to the District is included as Appendix 6.2-2, Attachment 6.2-2.1.

The impact analysis was used to determine the worst-case ground-level impacts of the Project. The results were compared with established ambient air quality standards and significance levels. If the standards are not violated and significance levels are not exceeded under worst-case conditions, then no exceedances are expected under any conditions. In accordance with regulatory guidance (EPA, 1998; ARB,1989), the ground-level impact analysis includes the following worst-case dispersion conditions:

- impacts in simple terrain,
- impaction of plume on elevated terrain,
- aerodynamic downwash due to nearby building(s),
- impacts from fumigation conditions, and
- impacts from shoreline fumigation conditions.

Simple terrain impacts were assessed for meteorological conditions that would cause the plume to loop, cone, or fan out. Looping plumes occur when the atmosphere is very unstable, such as on a bright sunny afternoon when vigorous convective mixing of the air can transport the entire plume to ground level near the source. Coning plumes occur throughout the day when the atmosphere is neutral or slightly unstable. Fanning plumes are most common at night and in the early morning, when the atmosphere is stable and vertical motions are suppressed.

Plume impaction on elevated terrain, such as on the slope of a nearby hill, can cause high ground-level concentrations, especially under stable atmospheric conditions. High ground-level pollutant concentrations can also be caused by building downwash. Building downwash occurs when a building is in close proximity to the emission stack and results in plume wake around the building; the stack plume is drawn downward to the ground by the lower pressure region that exists in the turbulent wake on the lee side of an adjacent building.

Fumigation conditions occur when a stable layer of air lies a short distance above the release point of the plume and an unstable air layer lies below. The low mixing height that results from this condition allows little diffusion of the stack plume before it is carried downwind to the ground. Although fumigation conditions rarely last as long as an hour, relatively high ground-level concentrations may be reached during that period. Fumigation tends to occur under clear skies and light winds, and is more prevalent in the summer. Because land surfaces tend to both heat and cool more rapidly than water, shoreline fumigation tends to occur on sunny days when the denser cooler air over water displaces the warmer, lighter air over land. During an inland sea breeze, the unstable air over land gradually increases in depth with inland distance. The boundary between the stable air over the water and the unstable air over the land and the wind speed determine if the plume will loop down before much dispersion of the pollutants has occurred.

The basic model equation used in this analysis assumes that the concentrations of emissions within a plume can be characterized by a Gaussian distribution about the centerline of the plume (see Figure 6.2-15). The Gaussian dispersion models approved by EPA for regulatory use are generally conservative (i.e., the models tend to overpredict actual impacts). The EPA models were used to determine if ambient air quality standards may be exceeded, and whether a more accurate and sophisticated modeling procedure would be warranted to make the impact determination. The sections that follow describe:

- Screening procedures;
- Refined air quality impact analysis;
- Existing ambient pollutant concentrations and preconstruction monitoring;
- Results of the ambient air quality modeling analyses; and
- PSD increment consumption.

The screening and refined air quality impact analyses were performed using the latest version of the Industrial Source Complex, Short-Term Model ISCST3 (Version 00101). ISCST3 is a versatile Gaussian dispersion model capable of assessing impacts from a variety of separate sources in regions of simple, intermediate, and complex terrain. The model can account for settling and dry deposition of particulate; area, line, and volume sources; plume rise as a function of downwind distance; separation of point sources; and elevated receptors. The model is capable of estimating concentrations for a wide range of averaging times (from one hour to one year). Impacts in simple terrain under downwash conditions, particularly areas close to the stack where building downwash may occur, were also estimated using the ISCST3 model.

Inputs required by the ISCST3 model include the following:

- Model options;
- Meteorological data;
- Source data; and
- Receptor data.

Model options refer to user selections that account for conditions specific to the area being modeled or to the emissions source that needs to be examined. Examples of model options include use of site-specific vertical profiles of wind speed and temperature; consideration of stack and building wake effects; and time-dependent exponential decay of pollutants. The model supplies recommended default options for the user. Except where explicitly stated, such as for building downwash (described in more detail below), default values were used. A number of these default values are required for EPA and local District approval of model results.

The EPA regulatory default options used include stacktip downwash effects; buoyancy-induced dispersion for heated effluent; and exclusion of calm meteorological conditions (wind speeds of less than one meter per second) from the dispersion calculations.

The performance of ISCST3 is improved by the use of actual meteorological data. The EPA criteria for determining whether the meteorological data are representative are the proximity of the meteorological monitoring site to the area under consideration; the complexity of the terrain; the exposure of the meteorological monitoring site; and the period of time during which the data are collected. The meteorological data set determined to be representative for use for the proposed Project consists of data collected by PG&E at MBPP between 1994 and 1996. These data meet the EPA criteria for representativeness, as follows:

- Proximity: The data were collected on-site, and thus meet the criteria for proximity.
- Complexity of Terrain and Exposure of Meteorological Monitoring Site: The terrain surrounding the meteorological station is the same as the terrain surrounding the Project: fairly flat with small, isolated hills nearby and complex terrain approximately one mile to the east. There are no terrain features that would cause the meteorological data to be affected differently than the Project site, so the exposure of the station and the Project are identical.
- Period of Data Collection: Meteorological data have been collected at the meteorological station for many years. The 1994 through 1996 data set was selected by the SLOCAPCD as representing recent available data and spanning a three–year period to provide exposure to a variety of meteorological conditions. As the data were collected on-site, one year of meteorological data would be sufficient under EPA guidelines.

The required emission source data inputs to ISCST3 include source locations, source elevations, stack heights, stack diameters, stack exit temperatures and velocities, and emission rates. The source locations are specified for a Cartesian (x,y) coordinate system where x and y are distances East and North in meters, respectively. The stack height that can be used in the model is limited by federal Good Engineering Practice (GEP) stack height restrictions, discussed in more detail below. In addition, ISCST3 requires nearby building dimension data to calculate the impacts of building downwash.

The determination of an appropriate height for an exhaust stack is based on a number of factors, including engineering, public health, and aesthetics. The engineering factors ensure that the stack is designed to allow the stack gases to move efficiently. In addition, the stack must be designed so that the air emissions in the exhaust gas can be accurately measured. The height of the stack and the speed and temperature of the exhaust gases determine the shape and dimensions of the exhaust plume under different weather conditions. These engineering factors usually influence the shape, diameter, and height of the stack.

Public health considerations ensure that the stack will not result in unhealthy concentrations of air pollutants under any combination of operating conditions and weather conditions. These factors relate to stack diameter and height.

The aesthetic factors ensure that the stack presents the minimum possible disturbance to viewsheds, and principally relate to stack height.

When all three of these considerations are combined, the stack shape and diameter are established through engineering design parameters and the stack height is set at the lowest height where the engineering and public health criteria are met. The aesthetic considerations are accommodated to the extent possible once compliance with the engineering and public health criteria is achieved. In the case of the new units at the MBPP, the minimum height required to meet all of the engineering criteria was 145 feet. This, then, became the first height evaluated for air quality and public health impacts. The air quality impacts were evaluated for the complete range of turbine operating conditions using three full years of weather data collected at the site. This process ensured that all possible combinations of turbine operating conditions and weather conditions were evaluated. The results of this worst-case analysis were compared with applicable state and federal air quality standards and health risk levels. The analysis showed that the 145-foot stack height would not result in unhealthy air quality impacts; consequently, this stack height was accepted for the Project design.

For the purposes of modeling, a stack height beyond what is required by Good Engineering Practices (GEP) is not allowed (40 CFR 52.21 (h)). However, this requirement does not place a limit on the actual constructed height of a stack. GEP, as used in modeling analyses, is the height necessary to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, or wakes that may be created by the source itself, nearby structures, or nearby terrain obstacles. In addition, the GEP modeling restriction assures that any required regulatory control measure is not compromised by the effect of that portion of the stack that exceeds the GEP. The EPA guidance (EPA, 1985) for determining GEP stack height is as follows:

$$H_g = H + 1.5L$$

where

H_g = Good Engineering Practice stack height, measured from the ground-level elevation at the base of the stack

H = height of nearby structure(s) measured from the ground-level elevation at the base of the stack

L = lesser dimension, height or projected width, of nearby structure(s)

In using this equation, the guidance document indicates that both the height and width of the structure are determined from the frontal area of the structure, projected onto a plane perpendicular to the direction of the wind.

For the turbine/HRSG stacks, the nearby (influencing) structures are the HRSGs, which are 90 feet (27.43 meters [m]) high and 198 feet (60.4 m) long. Thus H = L = 90 feet, and H_g = (2.5 * 90 ft) = 225 ft, and the proposed stack height of 145 feet does not exceed GEP stack height.

For the boiler stacks, the nearby structure is the boiler building, which is 153 feet high and has a projected width of 217 feet. For this building, H = L = 153 feet and H_g = 383 feet. Thus the boiler stacks cannot be modeled at their full physical height of 450 feet; the heights are GEP-limited to 383 feet.

For regulatory applications, a building is considered sufficiently close to a stack to cause wake effects when the distance between the stack and the nearest part of the building is less than or equal to five times the lesser of the height or the projected width of the building.

For the buildings analyzed as downwash structures, the building dimensions, accurate to $\pm$ 1 foot, were obtained from the facility plot plans. The building dimensions were analyzed using software designed specifically for this purpose (program BEE-BPIP (Building Profile Input Program), Bowman Environmental Engineering, Dallas, TX) to derive 36 wind-direction-specific building heights and projected building widths for use in building wake calculations. The building dimensions used in the GEP analysis are shown in Appendix 6.2-2, Figure 6.2-2.1.

Screening Procedures

To ensure the impacts analyzed were for maximum emission levels and worst-case dispersion conditions, a screening procedure was used to determine the inputs to the impact modeling. The screening procedure analyzed the turbine operating conditions that would result in the maximum impacts on a pollutant-specific basis. The operating conditions examined in this screening analysis, along with their exhaust and emission characteristics, are shown in Appendix 6.2-2, Table 6.2-2.1. These operating conditions represent a range of turbine loads (100% with duct firing, 100% without duct firing, and 50%) at maximum and minimum anticipated operating temperatures (85☜ and 34☜F).

The operating conditions were screened for worst-case ambient impact using EPA's ISCST3 model and the meteorological data described above. The screening analysis showed that maximum ground-level concentrations for all pollutants and averaging periods except annual PM_{10} result during 100% load operation with duct firing at the maximum nominal temperature (85°). Maximum annual PM_{10} impacts are predicted to occur during 50% load operation at maximum nominal temperature. The results of the screening procedure are presented in Appendix 6.2-2, Table 6.2-2.2. The stack parameters for the turbine operating condition that produced the maximum modeled impact for each pollutant and averaging period were then used in the refined modeling analysis to evaluate the modeled impacts of the entire Project for each pollutant and averaging period.

The screening analysis included both simple and complex terrain. Terrain features were taken from USGS DEM data and 7.5-minute quadrangle maps of the area. For the screening analysis, a coarse Cartesian grid of receptors spaced at 180 meters was used with a finer grid, spaced at 25 meters, around the facility fenceline. The coarse grid extended to approximately seven kilometers east of the facility and three kilometers in the other directions to ensure that maximum turbine impacts were identified.

Refined Air Quality Impact Analysis

The complete modeling input for each pollutant and averaging period is shown in Appendix 6.2-2, Tables 6.2-2.3 and 2.4. As discussed above, the turbine stack parameters used in modeling the impacts for each pollutant and averaging period reflected the worst-case turbine operating condition for that pollutant and averaging period identified in the screening analysis. Boiler emissions reflect actual average emission rates during the most recent three-year period.

In evaluating ambient impacts of the Project, the turbines alone were modeled. This results in a conservative, worst-case estimate of Project impacts, as it does not reflect the benefits of eliminating emissions from existing Units 1 through 4.

The model receptor grid was derived from 30 x 30 meter DEM data. Initially, a 180 x 180 meter interval coarse receptor grid was extended in the four cardinal directions from the stack. The Cartesian grid extended seven kilometers to the east of the facility center and three kilometers in the other directions. Receptors were also placed in Cayucos, Los Osos, and Cambria.

Fine receptor grids (60 x 60 meter) were used in areas where the coarse grid analysis indicated modeled maxima would be located. Receptors over the bay and ocean were included in both the coarse and fine grids. A map showing the layout of the modeling grid is presented in Figure 6.2-16.

Receptors for the refined modeling analysis were from USGS DEM data for three 7.5-minute quadrangles (Morro Bay South, Morro Bay North, and Cayucos). The coarse grid contained a total of 2,356 receptors. The refined grids contained a total of 1,203 receptors.

Specialized Modeling Analyses

- **Fumigation Modeling**: Fumigation occurs when a stable layer of air lies a short distance above the release point of a plume and unstable air lies below. Under these conditions, an exhaust plume may be drawn to the ground with little diffusion, causing high ground-level pollutant concentrations. Although fumigation conditions rarely last as long as one hour, relatively high ground-level concentrations may be reached during that time.

  The SCREEN3 model was used to evaluate maximum ground-level concentrations for short-term averaging periods (24 hours or less) under fumigation conditions. EPA guidance (1992) was followed in evaluating fumigation impacts. Emission rates and stack parameters for the refined modeling analysis were used in the fumigation analysis. Since SCREEN3 is a single source model, a single turbine was modeled and the impacts were multiplied by four to determine total impacts under fumigation conditions.

  Calculation of inversion breakup fumigation impacts is shown in Appendix 6.2-2, Table 6.2-2.5.

- **Shoreline Fumigation Modeling**: Shoreline fumigation modeling was also conducted to determine the impacts as a result of overwater plume dispersion. Because land surfaces tend both to heat and to cool more rapidly than water, shoreline fumigation tends to occur on sunny days when the denser cooler air over water displaces the warmer, lighter air over land. During an inland sea breeze, the unstable air over land gradually increases in depth with inland distance. The boundary between the stable air over the water and the unstable air over the land and the wind speed determine if the plume will loop down before much dispersion of the pollutants has occurred.

SCREEN3 can examine sources within 3000 meters of a large body of water, and was used to calculate the maximum shoreline fumigation impact. The model uses a stable onshore flow and a wind speed of 2.5 meters per second; the maximum ground-level shoreline fumigation concentration is assumed by the model to occur where the top of the stable plume intersects the top of the well-mixed thermal inversion boundary layer (TIBL). The model TIBL height was varied in accordance with BAAQMD procedures* (between 2 and 6) to determine the highest shoreline fumigation impact. The worst-case (highest) impact was used in determining facility impacts due to shoreline fumigation. In accordance with EPA guidance, shoreline fumigation was assumed to persist for a maximum of 90 minutes, and the impacts on all short-term averaging periods were assessed.

Calculation of shoreline fumigation impacts is also shown in Appendix 6.2-2, Table 6.2-2.5.

- **Turbine Startup**: Facility impacts were also modeled during the startup of two turbines to evaluate short-term impacts under startup conditions. This analysis included two turbines in startup and two turbines at maximum load with duct firing. Emission rates during startup were based on an engineering analysis of available data, which included source test data from startups of the GE gas turbine at the Crockett Cogeneration Project. A summary of the data evaluated in developing these emission rates was shown in Appendix 6.2-1, Table 6.2-1.4. The hourly startup emission rates shown for NOx and CO are hourly average values over the startup period. Maximum hourly emissions during a single hour are expected to be no higher than 1.5 times the average hourly startup emissions, and these maximum hourly rates were used in evaluating startup impacts.

  Turbine exhaust parameters for the minimum operating load point (50%) were used to characterize turbine exhaust during startup. Startup impacts were evaluated for both the one- and three-hour averaging periods using ISCST3**. Emission rates and stack parameters used in the startup modeling analysis are shown in Table 6.2-34 below. Calculation of startup impacts is shown in more detail in Appendix 6.2-2, Table 6.2-2.6.

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* BAAQMD procedures implement the EPA guidance on evaluating shoreline fumigation (EPA 1992).

** The ISC_OLM version of the ISCST3 model was used with concurrent ozone data from the District's Morro Bay monitoring station to determine hourly NO_2 impacts under startup and commissioning conditions.

TABLE 6.2-34
EMISSION RATES AND STACK PARAMETERS USED IN MODELING ANALYSIS FOR TURBINE STARTUP EMISSIONS IMPACTS

PARAMETER	UNITS	STARTUP	BASE LOAD WITH DUCT FIRING
Turbine stack temperature	degrees K	344.1	353.6
Turbine exhaust velocity	meters per second	12.13	18.41
One-hour average impacts			
NOx emission rate	pounds per hour	120	18.75
SO_2 emission rate	pounds per hour	0.77	1.45
CO emission rate	pounds per hour	1240	27.41
Three-hour average impacts			
NOx emission rate	--	--	--
SO_2 emission rate	pounds per hour	0.77	1.45
CO emission rate	--	--	--

- **Turbine Commissioning:** Two high-emissions scenarios are possible during commissioning. The first would be the period of time prior to SCR system installation when the combustor is being tuned. Under this scenario, NOx emissions would be high because the NOx emissions control system would not be functioning and because the combustor would not be tuned for optimum performance. CO emissions would also be high because combustor performance would not be optimized; however, since there is no external CO control for the turbines, CO emissions during commissioning are not expected to be any higher than CO emissions evaluated during startup operations.

  The second high-emissions scenario would occur when the combustor has been tuned but the SCR installation is not complete, and other parts of the turbine operating system are being checked out. This is likely to occur under transient conditions, characterized by 50 percent load operation. Since the combustor would be tuned but the SCR installation would not be complete, CO levels would not be expected to be elevated but NOx levels would again be high. Therefore, this analysis will be limited to ambient NO_2 impacts during commissioning.

- **Fog Effects on Dispersion:** Fog is the result of specific meteorological conditions (very high relative humidity, often accompanied by low wind speeds) that generally occur in the lower atmosphere. The conditions that produce fog are contained within the meteorological data that were collected near the power plant. Dispersion during foggy conditions was evaluated by isolating these meteorological conditions in the three-year meteorological data set and comparing modeled short-term impacts under these conditions with the maximum modeled impacts under all meteorological conditions.

6.2.6.3.2 Results of the Ambient Air Quality Modeling Analyses

Maximum baseline and future facility impacts are summarized in Tables 6.2-35 and 6.2-36, respectively. The analysis shows that the maximum impacts from the existing boilers and the new turbines occur on Morro Rock. Shoreline fumigation dispersion conditions produce the maximum short-term turbine impacts.

TABLE 6.2-35
SUMMARY OF RESULTS FROM REFINED MODELING ANALYSES: EXISTING BOILERS
MORRO BAY POWER PLANT

POLLUTANT	AVERAGING TIME	MODELED CONCENTRATIONS ($\mu g/m^3$)	
		High	Highest Second High[2]
NOx[1]	1-hour	222.7	n/a
	Annual	2.0	n/a
SO_2	1-hour	3.22	n/a
	3-hour	n/a	2.31
	24-hour	0.90	0.61
	Annual	0.03	n/a
CO	1-hour	416.2	408.2
	8-hour	224.4	184.1
PM_{10}	24-hour	11.4	7.82
	Annual	0.33	n/a

(1) Modeled using ISC_OLM with concurrent ozone data to account for ozone limiting of NOx formation.
(2) H2H concentrations used for comparison with short-term federal standards.

Impacts During Turbine Commissioning

As discussed above, there are two potential scenarios during turbine commissioning activities under which NO_2 impacts could be higher than under other operating conditions already evaluated.

Scenario 1: Under this scenario, NOx emissions can be conservatively estimated to be twice the guaranteed turbine-out level of 25 ppmvd @ 15 percent O_2, or 50 ppm. If operation under this condition were to continue for 1 hour, maximum hourly NOx emissions at full load would be (50 ppm / 2.5 ppm) * 16.72 lbs/hr = 334.4 lbs/hr.

TABLE 6.2-36
SUMMARY OF RESULTS FROM REFINED MODELING ANALYSES: TURBINES
MORRO BAY POWER PLANT

POLLUTANT	AVG TIME	MODELED CONCENTRATIONS ($\mu g/m^3$)				
		ISCST3		FUMIGATION	SHORELINE FUMIGATION	STARTUP
		High	Highest Second High			
NOx[1]	1-hour Annual	220.4 2.6	n/a n/a	13.3 --	105.1 --	185.9 --
SO_2	1-hour 3-hour 24-hour Annual	17.3 11.9 2.7 0.23	n/a 10.4 2.2 n/a	1.03 0.93 0.41 --	8.1 4.1 0.54 --	11.9 8.3 -- --
CO	1-hour 8-hour	326.3 1,508.3	317.0 1,249.6	19.5 159.3	153.6 347.7	8,615.4 --
PM_{10}	24-hour Annual	24.2 2.7	20.2 n/a	3.6 --	4.6 --	-- --

(1) Modeled using ISC_OLM with concurrent ozone data to account for ozone limiting of NO_2 formation.
(2) H2H concentrations used for comparison with short-term federal standards

Scenario 2: Under these lower load conditions, NOx emissions could be as high as 100 ppm @ 15 percent O_2. Based on the transient nature of the loads, the average fuel consumption would be expected to be equivalent to half the full load flow rate, or 925 MMBtu/hr. Worst-case hourly NOx emissions under this scenario would be (100 ppm/2.5 ppm) * 8.36 lbs/hr = 334.4 lbs/hr.

As the maximum hourly emissions under each scenario are expected to be the same, the maximum modeled NO_2 impact will occur under the turbine operating conditions that are less favorable for dispersion. These conditions are expected to occur at 50 percent load, because exhaust mass flow and thus final plume rise are lower than at full load.

The results of the turbine screening analysis can be used to evaluate modeled NOx impacts of a single turbine at this emission rate. The screening analysis showed that the highest one-hour unit impact is 27.17 $\mu g/m^3$ per g/s. Using the 334.4 lb/hr (42.13 g/s) emission rate derived above yields a maximum one-hour NOx impact under either scenario of 1,144.8 $\mu g/m^3$ before ozone limiting. With ozone limiting, the highest one-hour NO_2 concentration during commissioning is not expected to exceed 210.8 $\mu g/m^3$. Using the background NO_2 concentration of 122 $\mu g/m^3$, the total impact will not exceed 332.8 $\mu g/m^3$, which is well below the state one-hour NO_2 standard of 470 $\mu g/m^3$.

Fog Effects on Dispersion

In the 1994 meteorological data set, about 29% of all hours were identified as having meteorological conditions that would be expected to produce fog, based on a relative humidity in excess of 91.7 %. This criterion yields 51% of all days at Morro Bay in 1994 having at least one hour of fog, which corresponds to the long-term fog statistics shown by the National Weather Service at the Point Mugu station. Emissions from the existing boilers and the new turbines were modeled separately using ISCST3 and these meteorological conditions to evaluate ambient impacts of the existing and proposed power plants under foggy conditions. The modeling results show that the weather conditions that cause fog can also affect dispersion, mostly depending on the mixing height and the persistence of the wind direction. Fog by itself only indirectly affects dispersion, usually through its influence on establishing mixing height. Maximum impacts are lower on Morro Rock when it is foggy, because mixing heights are usually higher than when there is no fog. However, impacts on other hills to the north-northeast, east-northeast and southeast of the power plant are higher when it is foggy because the prevailing winds appear to be more persistent than when there is no fog. Since the foggy and non-foggy conditions alike are included in the three-year meteorological data set used to model impacts for the project, the effects of fog on dispersion are reflected in the results reported in Table 6.2-36.

Ambient Air Quality Impacts

To determine the maximum ground-level impacts on ambient air quality for comparison to the applicable standards, modeled worst-case impacts (shown in Table 6.2-36) were added to maximum observed background concentrations.

For background ambient pollutant concentrations for those pollutants that do not exceed the PSD monitoring exemption levels (see below), EPA guidelines (Section 2.4, EPA, 1987) state that the existing monitoring data must be representative of the proposed facility impact area. ARB monitors ambient NO_2 and CO concentrations in San Luis Obispo, less than 20 miles from MBPP. This monitoring station is situated in a more developed area than the power plant, and concentrations monitored there are expected to be somewhat higher than those at Morro Bay. SO_2 is monitored in Grover City, approximately 20 miles southeast of Morro Bay; SO_2 monitoring at Morro Bay ended after 1995. During the period when SO_2 concentrations were monitored in both locations, Grover City concentrations were consistently higher than those measured in Morro Bay. Therefore, the most recent concentrations monitored in Grover City provide a conservatively high background concentration for SO_2 at Morro Bay. ARB also monitors PM_{10} at Morro Bay. The most recent three years (Section 2.4.3 of EPA guidelines, 1987) of the existing monitoring data are used for background ambient pollutant concentrations.

Table 6.2-37 presents the maximum concentrations of NOx, SO_2, CO, and PM_{10} recorded for 1996 through 1998 from the San Luis Obispo, Grover City, and Morro Bay monitoring stations.

Maximum ground-level impacts due to operation of the facility are shown together with the ambient air quality standards in Table 6.2-38. Despite the conservative (overpredictive) assumptions used throughout the analysis, the results indicate that the addition of the new turbines at MBPP will not cause or contribute to violations of any state or federal air quality standards, with the exception of the state PM_{10} standard. For this pollutant, existing concentrations already exceed the state standard; however, as discussed further below, the proposed Project will result in a cumulative impact that is below PSD significance levels. In addition, offsets will be provided for the net increase in PM_{10} emissions from the Project; this is also discussed further below.

TABLE 6.2-37
MAXIMUM BACKGROUND CONCENTRATIONS, 1997-1999 ($\mu g/m^3$)

POLLUTANT	AVERAGING TIME	1997	1998	1999
San Luis Obispo Monitoring Station				
NO_2	1-Hour	122	115	120
	Annual	25	23	25
CO	1-Hour	6,988	4,571	5,714
	8-Hour	3,028	2,555	3,444
Grover City Monitoring Station				
SO_2	1-Hour	106	47	104
	24-hour	8	10	13
	Annual	0	0	0
Morro Bay Monitoring Station				
PM_{10}	24-Hour	57	33	39
	Annual (AAM)[1]	20.6	13.5	14.4
	Annual (AGM)[2]	18.6	14.6	15.7

(1) Annual Arithmetic Mean
(2) Annual Geometric Mean

TABLE 6.2-38
MODELED MAXIMUM PROJECT IMPACTS: NEW TURBINES ONLY
INCLUDING IMPACTS ON MORRO ROCK
MORRO BAY POWER PLANT

POLLUTANT	AVG TIME	PROJECT IMPACT (μg/m³) High	PROJECT IMPACT (μg/m³) Highest Second High	BACK-GROUND (μg/m³)	TOTAL IMPACT (High) (μg/m³)	STATE STD (μg/m³)	TOTAL IMPACT (H2H) (μg/m³)	FEDERAL STD (μg/m³)
NO_2	1-hour	220.4	--	122	342.4	470	--	--
	Annual	2.6	--	25	--	--	27.6	100
SO_2	1-hour	17.3	--	106	123.3	650	--	--
	24-hour	11.9	10.4	13	24.9	109	23.4	365
	Annual	0.23	--	0	0.23	--	0.23	80
CO	1-hour	8,615.4	--	6,988	15,603	23,000	15,603	40,000
	8-hour	1,508.3	1,249.6	3,444	4,952	10,000	4,694	10,000
PM_{10}	24-hour	24.2	20.2	57	81.2	50	77.2	150
	Annual(1)	2.7	--	20.6	23.3	30	--	--
	Annual(2)	2.7	--	18.6	--	--	21.3	50

(1) Annual Arithmetic Mean.
(2) Annual Geometric Mean.

Ambient Air Quality Impacts in Other Locations

To provide a more complete assessment of the ambient impacts of the Project on the community, impacts were also evaluated in the nearby towns of Cambria, Cayucos and Los Osos. Table 6.2-39 shows that Project impacts in those communities will be much lower than the maximum concentrations shown in Table 6.2-38.

TABLE 6.2-39
MAXIMUM MODELED CONCENTRATIONS IN NEARBY COMMUNITIES
MORRO BAY POWER PLANT

Pollutant	Averaging Period	Maximum Modeled Concentration from ISCST3, ug/m³ Morro Bay	Cambria	Cayucos	Los Osos
NO_2	1-hour	220	7.6	10.9	10.9
	annual	2.9	0.09	0.10	0.08
SOx	1-hour	17.3	0.6	0.8	0.8
	3-hour	11.9	0.4	0.5	0.5
	24-hour	2.7	0.08	0.2	0.1
	annual	0.23	0.007	0.008	0.006
CO	1-hour	326.3	11.1	15.9	16.0
	8-hour	1,508.3	38.0	55.1	69.6
PM_{10}	24-hour	24.2	0.7	1.5	1.0
	annual	2.7	0.07	0.1	0.07

6.2.6.3.3 PSD Requirements

Applicability of PSD Requirements

Because the Project is considered a major modification to a major stationary source, compliance with PSD requirements must be demonstrated. The PSD program was established to allow emission increases (increments of consumption) that do not result in significant deterioration of ambient air quality in areas where criteria pollutants have not exceeded NAAQS. For the purposes of determining compliance with the requirements of the PSD program, the following regulatory procedure is used.

- Facility emissions are evaluated to determine if the magnitude of emissions may cause significant ambient air quality impacts. Because this facility is a modification to an existing major facility, the level of emissions that requires an analysis of ambient impacts is determined on a pollutant-specific basis.

- If an ambient air quality impact analysis is required, the analysis is first used to determine if the impact levels are significant. The determination of significance is based on whether the ambient impacts exceed established significance levels (40 CFR 51.165(b)(2)). If the significance levels are not exceeded, no further analysis is required. However, for CEQA purposes, a full analysis is required regardless of the modeled impacts.

- If the significance levels are exceeded, an analysis is required to demonstrate that the allowable increments will not be exceeded on a pollutant-specific basis. Increments are the maximum increases in concentration that are allowed to occur above the baseline concentration.

The net increase in facility emissions from Table 6.2-30 is compared with the PSD thresholds for major modifications in Table 6.2-40. This comparison shows that the Project will result in a significant increase only for PM_{10} emissions. The Project will result in net reductions in NOx, VOC, and CO emissions. The increase in emissions of SO_2 from the facility will be below the 40 ton per year threshold, so will not be significant. Thus, the Project is subject to PSD requirements only for PM_{10}.

TABLE 6.2-40

COMPARISON OF EMISSIONS INCREASE WITH FEDERAL PSD SIGNIFICANT EMISSIONS LEVELS MORRO BAY POWER PLANT

POLLUTANT	NET INCREASE (REDUCTION) (tons per year)	PSD SIGNIFICANT EMISSION LEVELS (tons per year)	FURTHER ANALYSIS REQUIRED?
NOx	(563.0)	40	NO
SO_2	13.0	40	NO
VOC	(14.5)	40	NO
CO	(518.7)	100	NO
PM_{10}	76.0	15	YES

Preconstruction Monitoring

To ensure that the impacts from the facility will not cause or contribute to a violation of an ambient air quality standard or an exceedance of a PSD increment, an analysis of the existing air quality in the area of the facility is necessary. The federal PSD regulation requires preconstruction ambient air quality monitoring data for the purposes of establishing background pollutant concentrations in the impact area (40 CFR 52.21 (m)(iii)) of any pollutant for which the project is subject to PSD review. However, a project may be exempted from this requirement if the predicted air quality impacts of the net emissions increase from the proposed modification do not exceed *de minimis* levels.

A facility may, with EPA=s approval, rely on air quality monitoring data collected at nearby, representative monitoring stations to satisfy the requirement for preconstruction monitoring. In such a case, in accordance with Section 2.4 of the EPA PSD guideline, the last three years of ambient monitoring data may be used if they are representative of air quality in the location of the maximum concentration increase from the proposed source.

Maximum modeled PM_{10} impacts from the turbines alone are compared with federal PSD *de minimis* levels in Table 6.2-41. Maximum impacts exceed *de minimis* levels.

TABLE 6.2-41

COMPARISON OF MODELED CONCENTRATIONS (TURBINES ALONE) WITH FEDERAL PSD PRECONSTRUCTION MONITORING THRESHOLDS

POLLUTANT	AVERAGING TIME	EXEMPTION CONCENTRATION ($\mu g/m^3$)	MAXIMUM MODELED CONCENTRATION[1] ($\mu g/m^3$)
PM_{10}	24 hours	10	20.2

(1) Highest second-high concentration used for comparison with federal requirements.

In general, the preconstruction monitoring threshold is exceeded only on Morro Rock. Maximum modeled concentrations of PM_{10} are below the threshold in all other locations (see Table 6.2-44, below). In addition, a modeling analysis of impacts from the existing boilers at MBPP shows a 24-hour average PM_{10} concentration from those boilers of slightly over 11 ug/m^3. Because the existing boilers are being shut down as part of this Project, the overall Project impact is significantly less than the modeled concentration of 20.2 ug/m^3. The wind roses presented in Figures 6.2-5a through 6.2-7e of the application show that prevailing winds in the Project area are onshore winds, so existing concentrations of all pollutants on the rock, which is upwind of the City of Morro Bay and other inland urban areas, can be expected to be much lower than concentrations monitored in other locations.

The applicant believes that ambient monitoring data exist that are representative of existing air quality in the Project area so that additional preconstruction monitoring is not necessary. All of the background ambient air quality data used in this analysis were collected in accordance with ARB guidance and reflect concentrations monitored within the past three years; thus, the data meet the EPA criteria for data quality and currentness.

To represent existing PM_{10} concentrations, the applicant proposes to use ambient PM_{10} monitoring data collected at the Morro Bay monitoring station, approximately one mile east-southeast of the power plant (see Figure 6.2-17 for locations of plant and monitoring station). Based on the predominant onshore winds, this monitoring station is downwind of the power plant most of the time, so concentrations measured at the station would be expected to represent existing emissions from the power plant as well as PM_{10} emissions from other sources in the City of Morro Bay. The PM_{10} data presented in Table 6.2-37 show that PM_{10} levels in Morro Bay are generally low: approximately 1/3 of the federal standard. By using the 1997 monitored maximum value of 57 ug/m3 (by far the highest concentration monitored in Morro Bay over the past four years), the applicant believes that the background concentrations of PM_{10} in the vicinity of the Project are being conservatively overestimated.

Further, a comparison of the 1997, 1998, and 1999 monitored PM_{10} concentrations in other nearby locations indicates that PM_{10} concentrations in the region remain well below the federal standard. This comparison is shown in Table 6.2-42 below. Therefore, the addition of the Project would not be expected to bring ambient PM_{10} levels anywhere near the national ambient air quality standard.

TABLE 6.2-42
MONITORED 24-HOUR AVERAGE PM_{10} CONCENTRATIONS
IN THE VICINITY OF MORRO BAY POWER PLANT

Monitoring Station	Calendar Year			Distance/Direction from Morro Bay Power Plant (mi)
	1997	1998	1999	
Morro Bay	57	33	39	~1 (ESE)
San Luis Obispo	55	32	44	~13 (SE)
Atascadero	70	47	43	~13 (NE)

Assessment of Significance for PSD

The maximum modeled PM_{10} impacts due to the Project are compared with the federal PSD significance levels in Table 6.2-43 below. Again, because the net increases of emissions of all pollutants except PM_{10} are below the PSD significant emissions thresholds, this analysis is not required under PSD for the other criteria pollutants.

TABLE 6.2-43
MAXIMUM MODELED IMPACTS AND
FEDERAL PSD SIGNIFICANCE THRESHOLDS
MORRO BAY POWER PLANT

POLLUTANT	AVERAGING TIME	MODELED IMPACTS[1] ($\mu g/m^3$)	FEDERAL PSD SIGNIFICANCE THRESHOLD ($\mu g/m^3$)	SIGNIFICANT UNDER FEDERAL PSD?
PM_{10}	24 hours annual	20.2 2.7	5 1	YES YES

(1) Highest second high used for 24-hour averaging period, highest modeled concentration used for annual averaging period.

This comparison shows that ambient impacts of PM_{10} from the Project are significant for PSD.

Assessment of Significance for CEQA

One commonly used measure of the significance of ambient Project impacts is the PSD significance levels. The maximum modeled impacts from the facility are compared with these significance levels in Table 6.2-44 below. This comparison shows that the significance levels for air quality impacts in Class II areas are exceeded for NOx, SO_2, one-hour CO, and annual PM_{10} only on Morro Rock. The significance level for 8-hour CO and 24-hour PM_{10} is exceeded in other locations as well. Although public access to Morro Rock is prohibited, the state park signage does not prevent physical access to the rock; therefore, under federal regulations, the rock is considered ambient air. However, since the rock is not legally accessible to the public, impacts there do not need to be evaluated for CEQA purposes. Since modeled impacts of all pollutants other than CO and PM_{10} at all other locations are well below the significance levels, under CEQA, most ambient impacts of the Project do not exceed the federal significance thresholds.

TABLE 6.2-44
COMPARISON OF MODELED IMPACTS FROM ISCST3
AND PSD SIGNIFICANCE THRESHOLDS
MORRO BAY POWER PLANT[1]

POLLUTANT	AVERAGING TIME	MAXIMUM MODELED IMPACTS FROM ISCST3, $\mu g/m^3$		FEDERAL PSD SIGNIFICANCE THRESHOLD, $\mu g/m^3$	SIGNIFICANT UNDER FEDERAL PSD?	
		ALL LOCATIONS	EXCLUDING MORRO ROCK		ALL LOCATIONS	EXCLUDING MORRO ROCK
NO_2	Annual	2.9	0.9	1.0	YES	NO
SO_2	3-Hour	10.4	3.8	25	NO	NO
	24-Hour	2.2	0.97	5	NO	NO
	Annual	0.2	0.1	1.0	NO	NO
PM_{10}	24-Hour	20.2	8.7	5	YES	YES
	Annual	2.7	0.8	1.0	YES	NO
CO	1-Hour	317.0	121.6	2,000	NO	NO
	8-Hour	1,249.6	528.1	500	YES	YES

(1) Highest second high used for short-term averaging periods, highest modeled concentration used for annual averaging period.

This modeling analysis does not account for the reductions in ambient concentrations that will occur from the shutdown of existing Units 1 through 4 at MBPP, or for the ambient reductions that will occur from the additional PM_{10} and PM_{10} precursor offsets that will be provided. The applicant believes that these CO and PM_{10} reductions will mitigate the impact of CO and PM_{10} emissions from the Project.

PSD Increment Consumption

Since the Project net emissions increases of NOx, CO, and SO_2 do not exceed PSD significance levels, an increments analysis is required only for PM_{10}. According to EPA Region IX staff, it has been determined that the application for a PSD permit for the proposed modification will be the first PSD application filed in San Luis Obispo County since the PSD trigger dates. Further, based on consultations with Monterey Bay Unified APCD, Santa Barbara County APCD, and San Joaquin Valley Unified APCD staffs, no PSD permits have been issued in those districts since the trigger date for sources that would have an annual average impact greater than 1 $\mu g/m^3$ in San Luis Obispo County. Therefore, the proposed Project would set the baseline date and is the only increment-consuming source in the District. Compliance with the PM_{10} increments is demonstrated by comparing the ambient impacts of the Project with the Class II increments for PM_{10}. This comparison is shown in Table 6.2-45 below.

TABLE 6.2-45
COMPARISON OF MAXIMUM MODELED IMPACTS FROM ISCST3
AND PSD CLASS II PM_{10} INCREMENTS
MORRO BAY POWER PLANT[1]

AVERAGING TIME	MAXIMUM MODELED IMPACT, μg/m^3	PSD CLASS II INCREMENT, μg/m^3	IN COMPLIANCE WITH INCREMENT?
24 hours	20.2	30	YES
annual	2.7	17	YES

(1) Based on regulatory guidance, highest second high used for 24-hour averaging period; highest modeled concentration used for annual averaging period.

Ambient Air Quality Impacts

Under the PSD regulations, the applicant must also make a demonstration that the Project will not cause or contribute to a violation of NAAQS. This demonstration was made previously in Table 6.2-40.

Impacts in Class I Areas

Federal regulations limit the degradation of air quality in areas designated Class I by imposing more stringent limits on air quality impacts there from new sources and modifications.* The only area designated Class I by EPA within 100 km of the Project is the San Rafael Wilderness in the Los Padres National Forest. Receptors were placed along the boundary of the Class I area nearest the Project to evaluate the maximum modeled impacts of the Project on the area. Since the Project is significant only for CO and PM_{10}, only CO and PM_{10} impacts are required to be modeled. However, for this analysis, all pollutants were included.

The results of the modeling analysis are compared with the Class I increments in Table 6.2-46. These results show that the modeled impacts of the Project in the nearby Class I area are far below the PSD Class I increments and will not significantly degrade air quality.

* Class I areas are areas designated by EPA as requiring special protection, such as National Parks and National Forests.

TABLE 6.2-46
PROJECT IMPACTS IN CLASS I AREA
MORRO BAY POWER PLANT[1]

POLLUTANT	AVERAGING PERIOD	IMPACT IN SAN RAFAEL WILDERNESS ($\mu g/m^3$)	PSD CLASS I INCREMENT ($\mu g/m^3$)
NO_2	Annual	0.01	2.5
SO_2	Annual 24 hours 3 hours	0.0009 0.005 0.01	2 5 25
PM_{10}	Annual 24 hours	0.009 0.04	2.8 5.7

(1) Based on regulatory guidance, highest second high used for 24-hour averaging period; highest modeled concentration used for annual averaging period.

6.2.6.4 Effects of Noncriteria Pollutants

6.2.6.4.1. Screening Health Risk Assessment

The health risk assessment (HRA) conducted determined the expected impact of potentially toxic compound emissions. The HRA was conducted in accordance with CAPCOA (1993). The acute and chronic hazard indices and carcinogenic risk were calculated using the most recent OEHHA RELs and cancer unit risk factors. Inhalation cancer risk was adjusted for multipathway exposure using multipathway adjustment factors developed by the South Coast AQMD for risk assessments (SCAQMD 1998). The HRA estimated the offsite carcinogenic risk to the maximally exposed individual (MEI), as well as indicated any adverse effects of non-carcinogenic compound emissions. Because of the conservatism (overprediction) built into the established risk analysis methodology, the actual risks will be lower than those estimated.

An HRA requires the following information:

- Unit risk factors (or carcinogenic potency values) for carcinogenic compounds that may be emitted;
- Noncancer Reference Exposure levels (RELs) for determining noncarcinogenic health impacts;
- One-hour and annual average emission rates for each compound of concern; and
- The maximum ambient one-hour and annual average concentration of each compound offsite and at the location of each sensitive receptor.

The unit risk factor of a carcinogenic substance is the estimated probability of a person contracting cancer as a result of constant exposure to an ambient concentration of 1 $\mu g/m^3$ over a 70-year lifetime. This factor represents the theoretical probability of extra cancer occurring in the exposed population assuming a 70-year lifetime exposure. The carcinogenic risk for each pollutant emitted is the product of the unit risk factor and the modeled ambient concentration, adjusted as necessary to reflect multipathway exposure. The carcinogenic risks from individual noncriteria pollutants are assumed to be additive, and the total risk must be below 10 in one million.

An evaluation of the potential noncancer health effects from long-term (chronic) and short-term (acute) exposures has also been included in the HRA. Many of the carcinogenic compounds also cause noncancer health effects and are therefore included in the determination of both cancer and noncancer effects. RELs are used as indicators of potential adverse health effects. These exposure levels are generally based on the most sensitive adverse health effect reported and are designed to protect the most sensitive individuals. Section 6.16 (Public Health) discusses the significance criteria for both carcinogenic and noncarcinogenic health effects in detail.

The noncriteria pollutants listed in Tables 6.2-32 and 6.2-33 were assessed for their health risks at offsite receptors, including the sensitive receptors identified in Table 6.16-1 and Figure 6.16-2.

The HRA results for the Project are presented in Table 6.2-47, and the detailed calculations are provided in Appendix 6.2-3.

The HRA results indicate that noncriteria pollutant impacts from the Project will be well below levels of significant risk. The results also indicate that no sensitive receptors will be adversely affected.

TABLE 6.2-47
HEALTH RISK ASSESSMENT RESULTS
MORRO BAY POWER PLANT

	BASELINE	PROJECT	SIGNIFICANCE LEVEL
Cancer Risk to Maximally Exposed Individual (All Sources)	1.4 in one million	2.5 in one million	10 in one million
Cancer Risk to Maximally Exposed Individual (excluding Emergency Diesel Engines)	<0.01 in one million	1.1 in one million	10 in one million
Acute Noncancer Hazard Index	0.06	0.4	1.0
Chronic Noncancer Hazard Index	0.002	0.009	1.0

6.2.6.4.2 SLOCAPCD Rule 219

SLOCAPCD Rule 219 (Toxics New Source Review) provides a mechanism for evaluating potential impacts of air emissions of toxic substances from new and modified sources. The rule applies only when there is an increase in toxic emissions or the distance to the nearest receptor has decreased. The Project will not affect the operation of the existing Diesel fire pump engines, Diesel emergency generator, or gasoline storage and dispensing, so those sources are not included in the assessment for purposes of this rule.

Although the shutdown of the existing boilers will eliminate emissions of benzene and formaldehyde from those sources, the new turbines will have slightly higher emissions of benzene and formaldehyde and will also emit other noncriteria pollutants that have not been attributed to the boilers in previous health risk assessments. Therefore, the assessment for purposes of compliance with Rule 219 evaluates potential toxic impacts of the proposed new turbines.

The noncriteria pollutant emissions from the new turbines are shown in Table 6.2-33. Only residential receptors were included in this analysis.

Acute and chronic chronic health hazard and cancer risk were assessed using the most recent OEHHA RELs and unit risk factors. Inhalation cancer risk was adjusted for multipathway exposure using multipathway adjustment factors developed by the South Coast AQMD for risk assessments (SCAQMD 1998). The results of this assessment are summarized in Table 6.2-48 below. Health hazard index and cancer risk calculations and a more detailed discussion of the Rule 219 risk assessment are included in Appendix 6.2-4.

TABLE 6.2-48
SLOCAPCD RULE 219 RISK ASSESSMENT RESULTS
MORRO BAY POWER PLANT

	PROJECT	SIGNIFICANCE LEVEL
Cancer Risk to Nearest Resident	0.1 in one million	1 in one million
Acute Noncancer Hazard Index	0.08	0.1
Chronic Noncancer Hazard Index	0.001	0.1

6.2.6.5 Visibility Screening Analysis

The ISCST3 model was used in screening mode to evaluate potential visibility impacts of the Project in the San Rafael Wilderness. The modeling followed screening guidance provided by the Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2

Summary Report, and by Trent Proctor and Mike McCorison of the U.S. Forest Service (USFS) (Federal Land Manager [FLM]).

ISCST3 was used with one year of hourly meteorological data from Morro Bay. In accordance with FLM guidance, flat terrain was assumed. Receptors were placed along the boundary of the Class I area closest to the Project site. Based on FLM Guidance, the VISCREEN model was not used to assess coherent plume visibility impacts because the distance to the Class I area is greater than 50 kilometers.

To assess visibility impacts at the Class I area, the 90th percentile background standard visual range (SVR) of 236 kilometers was used, as recommended by Trent Proctor and Mike McCorison of the USFS. This visual range corresponds to a background extinction coefficient of 16.57 Mm^{-1} (inverse Megameters). The relative humidity correction factor (*f*(RH)) was 1.99 for the Class I area. The allowable level of acceptable change (LAC) to extinction is 5 percent for USFS Class I areas.

Emission Rates

As discussed earlier, there will be a net reduction in emissions of most pollutants as a result of the Project. Turbine emissions used in the ISCST3 modeling analysis of visibility impacts were identical to those used in modeling the other impacts from the Project (see Appendix 6.2-2, Table 6.2-2.4); however, emission reductions were not modeled. The visibility impact analysis assumes that particulate nitrate (NO_3) is in the form of ammonium nitrate (NH_4NO_3) and that particulate sulfate (SO_4) is in the form of ammonium sulfate ($(NH_4)_2SO_4$). The visibility calculation is based on the resulting ambient concentrations of NH_4NO_3, $(NH_4)_2SO_4$, and PM_{10}, along with representative relative humidity adjustment factors.

Impacts

The maximum 24-hour visibility impact was generated by taking the maximum 24-hour average value at each receptor, regardless of which season it occurred, and assigning it to represent the visibility impact at the San Rafael Wilderness. A 40 percent nitrate conversion rate was assumed to persist for all seasons.

To calculate extinction coefficients, the following general equation is used:

$$b_{ext} = b_{SN} * f(RH) + b_{dry}$$

where:

b_{ext} = particle scattering coefficient

$b_{SN} = 3[((NH_4)_2SO_4) + (NH_4NO_3)]$

$b_{dry} = b_{Coarse}$

The quantities in brackets are the masses expressed in ug/m^3 and can be broken down further into the following equations:

$b_{NO3} = 3[1.29(NO_3)f(RH)]$

$b_{SO4} = 3[1.375(SO_4)f(RH)]$

$b_{Coarse} = 0.6[PM_{10}]$

The 24-hour average concentration data are summarized in Table 6.2-49.

TABLE 6.2-49
MAXIMUM PREDICTED 24-HOUR AVERAGE CONCENTRATIONS FROM ISCST3
MORRO BAY POWER PLANT

CLASS I AREA	NO_3 (ug/m^3)	SO_4 (ug/m^3)	PM_{10} (ug/m^3)
San Rafael Wilderness	0.0727	0.0086	0.0774

The above equations are used to calculate the extinction coefficients and to correct for f(RH) = 1.99 (except for b_{Coarse}, which is not corrected). Table 6.2-50 summarizes maximum extinction coefficients for each pollutant and total extinction.

TABLE 6.2-50
MAXIMUM IMPACTS ON VISIBILITY IN PROTECTED AREA
MORRO BAY POWER PLANT

CLASS I AREA	b_{NO3} (Mm^-1)	b_{SO4} (Mm^-1)	b_{Coarse} (Mm^-1)	24-HOUR AVERAGE VISIBILITY IMPACT (Mm^-1)	PERCENT CHANGE IN EXTINCTION	ACCEPTABLE CHANGE
San Rafael Wilderness	0.5599	0.0706	0.0464	0.6769	4.07	5

This calculation yields a change in extinction for the San Rafael Wilderness of 4.07 percent, which is less than the level of acceptable change of 5 percent for the Class I area.

6.2.6.6 Construction and Demolition Impacts Analysis

Analysis of the potential ambient impacts from air pollutants during the construction of the new turbines and the demolition of the existing boilers and stacks includes an assessment of emissions from vehicle and equipment exhaust and the fugitive dust generated from material handling. A detailed analysis of the emissions and ambient impacts is included in Appendix 6.2-5. With the exception of the maximum modeled 24-hour and annual average PM_{10} concentrations, the results of the analysis indicate that the maximum construction and demolition impacts will be below the state and federal standards for all the criteria pollutants emitted. The best available emission control techniques will be used for dust suppression and engine emissions during construction and demolition.

The MBPP construction site impacts are not unusual in comparison to most construction sites; construction sites that use good dust suppression techniques and low-emitting vehicles typically do not cause violations of air quality standards. The ISCST3 model overpredicts PM_{10} construction emission impacts due to the cold plume (i.e., ambient temperature) effect of dust emissions. Therefore it is unlikely that the construction activities will cause any violations of the PM_{10} standards.

Potential carcinogenic risks due to the brief exposure to Diesel exhaust during construction and demolition operations were also assessed. This analysis shows that the carcinogenic risk due to this exposure is expected to be well below the 10 in one million level considered to be significant.

6.2.7 CONSISTENCY WITH REGULATORY REQUIREMENTS

6.2.7.1 Consistency with Federal Requirements

As discussed in Section 6.2.3, EPA has retained the authority to issue PSD permits for projects in San Luis Obispo County. A separate PSD application will be filed with EPA Region IX to obtain the necessary permit for the proposed modification, and will include the emissions and air quality analyses contained in the AFC. The District has been delegated authority by EPA to implement and enforce most other federal requirements that are applicable to the facility, including the new source performance standards. Compliance with the District regulations ensures compliance and consistency with the corresponding federal requirements as well. The facility will also be required to comply with the federal Acid Rain requirements (Title IV). Since the District has received delegation for implementing Title IV through its Title V permit program, MBPP will apply for a modification to the District Title V permit that will include the necessary requirements for compliance with the Title IV Acid Rain provisions.

As discussed in AFC Section 6.2.5, Regulatory Setting, the federal PSD program requirements apply on a pollutant-specific basis to the following:

- a new major facility that will emit 100 tpy or more, if it is one of the 20 PSD source categories in the federal Clean Air Act, or a new facility that will emit 250 tpy or more; or
- a major modification to an existing major facility that will result in net emissions increases in excess of the significant emissions levels shown in Table 6.2-40.

The proposed Project is a major modification to an existing major facility. Therefore, it is subject to the EPA PSD regulations. The emissions levels summarized in Table 6.2-40 showed that the Project will result in a net increase in PM_{10} emissions that exceeds the PSD significance threshold for that pollutant, and is therefore subject to PSD review for that pollutant. PSD review is not required for any other pollutant.

As discussed above, the proposed major modification to a major stationary source result in an increase in PM_{10} emissions that exceeds the PSD trigger level, and therefore BACT must be used for this pollutant. The discussion of BACT for this pollutant is provided below in Section 6.2.6.3.

40 CFR '52.21(k) requires that the modeling be conducted with appropriate meteorological and topographic data necessary to estimate impacts. The MBPP modeling analyses used US Geological Service topographic data for the surrounding area and weather data gathered onsite by PG&E.

40 CFR '52.21(k) also requires a demonstration that emission increases subject to the PSD program will not interfere with the attainment or maintenance of any NAAQS for each applicable pollutant. As shown in Table 6.2-38, the proposed Project will not cause or contribute to an exceedance of any federal ambient air quality standard. The modeling analysis is discussed in detail in Section 6.2.6.2.

For an application that triggers PSD modeling requirements, 40 CFR '52.21(m) requires that ambient monitoring data be gathered for one year preceding the submittal of a complete application, or an EPA-approved representative time period. However, if the air quality impacts of the facility do not exceed the specified *de minimis* levels, on a pollutant-specific basis, the facility is exempted from the preconstruction monitoring requirement. The air quality impacts of the Project=s PM_{10} emissions are above the applicable *de minimis* level, as shown in Table 6.2-41, and therefore the exemption does not apply to the proposed Project. However, the CARB- and District-operated ambient monitoring stations in Morro Bay, Grover City, and San Luis Obispo were shown to be representative of existing air quality in the vicinity of the Project, and were used to determine existing ambient concentrations.

40 CFR '52.21(o) requires the applicant to provide an analysis of the impairment to visibility, soils, and vegetation that would occur as a result of the proposed Project. These analyses are provided in Sections 6.2.6.5, 6.4, and 6.6 of the AFC, respectively.

40 CFR '52.21(p) requires applicants to demonstrate that emissions from a new or modified facility will not cause or contribute to the exceedance of any NAAQS or any applicable Class I PSD increment. Impacts on visibility must also be evaluated. The analysis of impacts on the nearby Class I area, the San Rafael Wilderness area, is included in Section 6.2.6.5.

6.2.7.2 Consistency with State Requirements

State law establishes local air pollution control districts and air quality management districts with the principal responsibility for regulating emissions from stationary sources. As discussed in Section 6.2.5.1, the facility is under the local jurisdiction of the SLOCAPCD, and compliance with District regulations will ensure compliance with state air quality requirements.

6.2.7.3 Consistency with Local Requirements: SLOCAPCD

The SLOCAPCD has been delegated responsibility for implementing local, state, and federal air quality regulations (except PSD) in San Luis Obispo County. The facility is subject to SLOCAPCD regulations that apply to new sources of emissions, to the prohibitory regulations that specify emission standards for individual equipment categories, and to the requirements for evaluation of impacts from toxic air pollutants. The following sections include the evaluation of facility compliance with the applicable SLOCAPCD requirements.

Under the regulations that govern new sources of emissions, MBPP is required to secure a preconstruction Determination of Compliance from the SLOCAPCD (Rule 223), as well as demonstrate continued compliance with regulatory limits when the facility becomes operational. The preconstruction review includes a demonstration that the facility will use BACT and will provide the necessary emission offsets.

6.2.7.3.1 BACT

Applicable BACT levels were shown in Table 6.2-17. SLOCAPCD Rule 204 requires the new turbines to be equipped with BACT for an emissions increase of NOx, VOC, SOx, CO, and PM_{10}

(criteria pollutants) in excess of 25 pounds per day (250 lb/day for CO). As shown in Table 6.2-51, BACT is required for NOx, VOC, CO, and PM_{10}. The calculation of facility emissions was discussed in AFC Section 6.2.6.2.

TABLE 6.2-51
BEST AVAILABLE CONTROL TECHNOLOGY REQUIREMENTS
SLOCAPCD

POLLUTANT	APPLICABILITY LEVEL (lbs/day)	FACILITY NET INCREASE (lbs/day)	BACT REQUIRED
NOx	25	2,784.0	YES
SO_2	25	134.4	YES
VOC	25	644.3	YES
PM_{10}	25	1203.2	YES
CO	250	12,119.2	YES

BACT for the applicable pollutants was determined by reviewing the BAAQMD BACT Guidelines Manual, the South Coast Air Quality Management District BACT Guidelines Manual, the most recent Compilation of California BACT Determinations, CAPCOA (2nd Ed., November 1993), and EPA's BACT/LAER Clearinghouse. A summary of the review is provided in Appendix 6.2-6. For the gas turbines, the District considers BACT to be the most stringent level of demonstrated emission control that is feasible. The turbines at MBPP will use the BACT measures discussed below at the facility.

As a BACT measure, Duke will limit the fuels burned at the facility to natural gas, a clean burning fuel. Liquid fuels will not be fired at the facility. Burning of liquid fuels in the gas turbine combustors would result in greater criteria pollutant emissions than if the units burned only gaseous fuels. Hence, this measure acts to minimize the formation of all criteria air pollutants.

BACT for NOx Emissions

BACT for NOx emissions will be the use of low NOx emitting equipment and add-on controls. For the MBPP Project, Duke has selected gas turbines equipped with dry low-NOx combustors. The gas turbine dry low-NOx combustors will generate approximately 25 to 35 ppmvd NOx, corrected to 15% O_2. In addition, the turbines will be equipped with SCR systems to further reduce NOx emissions to 2.5 ppmvd NOx, corrected to 15% O_2, on a one-hour average basis. This emission rate has recently been accepted by the BAAQMD and USEPA Region IX as meeting the BACT requirements for NOx from gas turbines, and is consistent with ARB's recently released draft guidelines. The BAAQMD and SCAQMD BACT Guideline determinations for NOx from gas turbines are shown in Appendix 6.2-6. A top-down BACT analysis for NOx is also provided.

BACT for CO Emissions

BACT for CO emissions will be achieved by use of gas turbines equipped with dry low-NOx combustors and oxidation catalysts. Dry low-NOx combustors emit low levels of combustion CO while still maintaining low NOx formation. With this dry low-NOx technology and catalysts, the turbines will meet a CO limit of 6 ppmvd, corrected to 15% O_2. The BAAQMD has recently revised its BACT determination for gas turbines from 6 ppm to 10 ppm CO, corrected to 15% O_2. The BAAQMD BACT guidelines indicate that BACT from large gas turbines (>23 MMBtu/hr heat input) is an exhaust concentration not to exceed 10 ppmvd CO, corrected to 15% O_2. CO emissions from the MBPP gas turbines are consistent with this BACT requirement. A review of recent BACT determinations for CO from gas turbines is provided in Appendix 6.2-6.

ARB has suggested a BACT level of 6 ppmvd at 15% O_2, based principally on the use of oxidation catalyst technology, for CO nonattainment areas. In attainment areas such as San Luis Obispo County, ARB has given districts the discretion to set the BACT level for CO. The applicant's proposed 6 ppm level is consistent with these requirements.

BACT for VOC Emissions

BACT for VOC emissions will be achieved by use of the gas turbine dry low-NOx combustors. As in the case of CO emission formation, dry low-NOx combustors use air to fuel ratios that result in low combustion VOC while still maintaining low NOx levels. BACT for VOC emissions from combustion devices has historically been the use of best combustion practices, as the majority of the VOC emissions are low molecular weight compounds that are not susceptible to control by the oxidation catalysts. With the use of the dry low-NOx combustors, VOC emissions leaving the stacks will not exceed 2 ppmvd, corrected to 15% O_2, with an expected compliance tolerance of 1 ppm based on current source test methods. This level of emissions is consistent with the ARB's BACT requirements for VOC.

BACT for PM_{10} and SO_2 Emissions

BACT for PM_{10} is best combustion practices and the use of gaseous fuels. Use of clean burning natural gas fuel will result in minimal particulate emissions. SO_2 emissions will also be kept at a minimum by firing natural gas.

6.2.7.3.2 Offset Requirements

In addition to the BACT requirements, District Regulation 204 requires MBPP to provide emission offsets for all net facility increases if the facility potential to emit exceeds specified levels on a pollutant-specific basis. As shown in Table 6.2-52, offsets will be required for NOx, SO_2, VOC, CO and PM_{10} emissions.

TABLE 6.2-52
SLOCAPCD OFFSET REQUIREMENTS
AND PROJECT NET EMISSIONS INCREASES
MORRO BAY POWER PLANT

POLLUTANT	OFFSET THRESHOLD (tpy)	FACILITY POTENTIAL TO EMIT (tpy)	PROJECT NET INCREASE?	OFFSETS REQUIRED?
NOx	25	292.3	YES	YES
SO_2	25	23.0	YES	YES[1]
CO	250	917.4	YES	YES
VOC	25	77.6	YES	YES
PM_{10}	25	203.2	YES	YES

(1) SO_2 offsets required under 204.B.1.a and c because SO_2 is a precursor to PM_{10};.

Creditable emissions reductions were shown in Table 6.2-22. In accordance with Rule 211, emissions reductions are required to be discounted by 20% or to be BARCT-adjusted. A 20% discount has been applied to the SO_2, CO, VOC, and PM_{10} reductions in Table 6.2-22 to determine the ERCs.

The rule requires offsets to be provided at an offset ratio of 1:1. Because SO_2 emissions contribute to PM_{10} formation in the area and VOC and NOx are both precursors to ozone, the applicant is proposing to use the excess reduction in SO_2 emissions to offset increases in PM_{10} and the excess VOC reductions to offset the remaining increases in NOx, both at a ratio of 1:1.[1]

Table 6.2-53 below summarizes the offset requirements for the Project. While most of the required offsets will be obtained from on-site emission reductions, the applicant has also obtained offsets by purchasing ERCs. The quantities and sources of ERCs are also shown in Table 6.2-53. Copies of the ERC certificates purchased from Chevron are included as Appendix 6.2-7.

1 ARB, 1999.

TABLE 6.2-53
SUMMARY OF OFFSET REQUIREMENTS (TONS/YEAR)
MORRO BAY POWER PLANT

UNIT	NOx	SO_2	CO	VOC	PM_{10}
Net Increase from New Turbines	292.3	23.0	917.4	77.6	203.2
ERCs from Shutdown of Units 1 through 4	245.7	6.64	918.3	60.9	84.2
ERCs Held by Duke: Elimination of Oil Firing Chevron ERCs	 8.19 22.92	 194.93 1.23	 0 2.62	 0 32.89	 17.22 1.92
Remaining Offsets Required (Excess)	15.49	(179.80)	(3.52)	(16.19)	99.86
Interpollutant Offsets: VOC => NOx SOx => PM_{10}	 (15.49) 	 99.86		 15.49 	 (99.86)
Net Offsets Required (Excess)	0	(79.94)	(3.52)	(0.70)	0

Rule 204 also requires project denial if SO_2, NO_2, PM_{10}, or CO air quality modeling results indicate emissions will interfere with the attainment or maintenance of the applicable ambient air quality standards or will exceed PSD increments. The modeling analyses presented in Section 6.2.6.3 show that facility emissions will not interfere with the attainment or maintenance of the applicable air quality standards.

Rule 216, Federal Part 70 Permits (Title V permit program) applies to facilities that emit more than 100 tons per year on a pollutant-specific basis. As an existing major source under this rule, MBPP has already applied for and obtained a Title V permit from the District. Under the Title V permit program, the power plant will be required to obtain a revised operating permit prior to commencing operation of the new turbines. The Phase II acid rain requirements of Rule 217 are also applicable to the facility. As a Phase II Acid Rain facility, MBPP will be required to provide sufficient allowances for every ton of SO_2 emitted during a calendar year. MBPP will obtain any necessary allowances on the current open trade market. The power plant is also required to install and operate continuous monitoring systems on the new units.

Rule 219 (Toxics New Source Review) requires new and modified sources to demonstrate that emissions of toxics will not pose a significant health risk. The analysis provided in Section 6.2.6.4.2 demonstrated compliance with the requirements of Rule 219.

The general prohibitory rules of the District applicable to the facility and the determination of compliance follow.

Rule 401 (Visible Emissions). Any visible emissions from the Project will not be darker than No. 2 when compared to a Ringlemann Chart for any period(s) aggregating three minutes in any hour. Because the facility will burn clean fuels, the opacity standard of not greater than 20% for a period or periods aggregating three minutes in any hour and the particulate emission concentrations limit of 0.15 grains per standard cubic feet of exhaust gas volume will not be exceeded.

Rule 402 (Public Nuisance). The facility will emit insignificant quantities of odorous or visible substances; therefore, the facility will comply with this regulation.

Rule 403 (Particulate Matter Emission Standards). The emissions units will have particulate matter emission rates well below the limits of the rule.

Rule 404 (Sulfur Compound Emissions). Because the Project will use only natural gas fuel, all of the Rule 404 limits will easily be complied with.

Rule 405 (Nitrogen Oxides). Emissions from the new turbines will be well below the limit in this rule.

Rule 406 (Carbon Monoxide Emission Standards and Limits). Carbon monoxide emission rates from the new turbines will be well below the limit in this rule.

Rule 429 (NOx and CO Emissions from Electric Power Generation Boilers). This rule limits NOx, CO, and ammonia emissions from the existing boilers. The CO and ammonia limits are expressed as concentrations; the NOx limit is expressed as a facilitywide daily emission rate cap. The SLOCAPCD staff has indicated that the rule, which now applies only to boilers used for electric power generation, will be amended to cover electric power generation gas turbines as well. The NOx control technology and the continuous emissions monitoring systems will ensure continued compliance with this rule.

Rule 601 (New Source Performance Standards). This rule requires monitoring of fuel; imposes limits on the emissions of NOx and SO_2; and requires source testing of stack emissions, process monitoring, and data collection and recordkeeping. All of the BACT limits imposed on the facility will be more stringent than the requirements of the NSPS emission limits. Monitoring and recordkeeping requirements for BACT will be more stringent than the requirements in this rule; therefore, the project will comply with the NSPS regulation.

6.2.8 CUMULATIVE AIR QUALITY IMPACTS ANALYSIS

To ensure that potential cumulative impacts of the Project and other nearby projects are adequately considered, a cumulative impacts analysis will be conducted in accordance with the protocol included as Appendix 6.2-8.

6.2.9 MITIGATION

Mitigation will be provided for all emissions increases from the Project in the form of offsets, as required under District regulations.

6.2.10 REFERENCES

ARB. Emission Inventory Criteria and Guidelines Report for the Air Toxics "Hot Spots" Program, May 15, 1997.

ARB. Proposed Guidance for Power Plant Siting and Best Available Control Technology. June 23, 1999.

ARB. Proposed Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines. Draft, August 2000.

ARB. Reference Document for California Statewide Modeling Guideline. April 1989.

CAPCOA. Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines. October 1993.

CARNOT. Assessment of Health Risks Associated with Fuel Oil Utilization and Critique of AB 2588 Risk Assessment for MBPP. February 1994.

Office of Environmental Health Hazard Assessment. Acute and Chronic Exposure Levels Developed by OEHHA as of May 2000.

Office of Environmental Health Hazard Assessment. Hot Spots Unit Risk and Cancer Potency Values. June 9, 1999.

Pacific Gas and Electric Company. Revised Air Toxics "Hot Spots" Risk Assessment for MBPP. September 9, 1991.

Smith, T.B., W.D. Sanders, and D.M. Takeuchi. Application of Climatological Analysis to Minimize Air Pollution Impacts in California, Final Report on ARB Agreement A2-119-32. August 1984.

South Coast Air Quality Management District. "Risk Assessment Procedures for Rules 1401 and 212," Version 4.1, November 1998.

U.S. EPA. Compilation of Emission Factors. AP-42. Revised 7/00.

U.S. EPA. Guideline on Air Quality Models, 40 CFR, Part 51, Appendix W. July 1, 1999.

U.S. EPA. On-Site Meteorological Program Guidance for Regulatory Model Applications, EPA-450/4-87-013. August 1995.

U.S. EPA. Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised, EPA-454/R-92-019. October 1992.

U.S. EPA. Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD), EPA-450/4-87-007. May 1987.

U.S. EPA. Guideline for Determination of Good Engineering Practice Stack Height. June 1985.

Figure 6.2-1

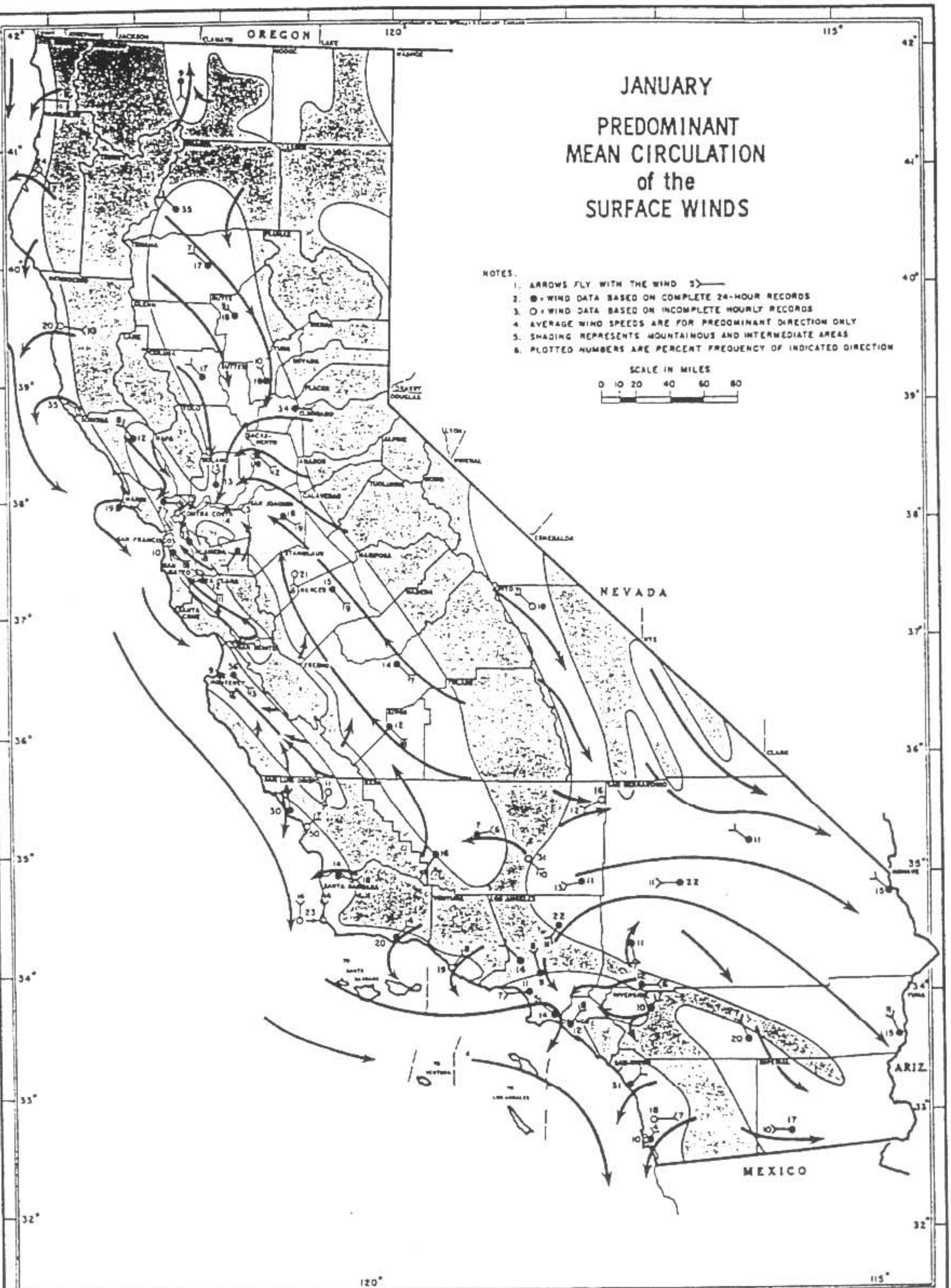

JANUARY
PREDOMINANT
MEAN CIRCULATION
of the
SURFACE WINDS
NOTES.
1. ARROWS FLY WITH THE WIND
2. ● = WIND DATA BASED ON COMPLETE 24-HOUR RECORDS
3. ○ = WIND DATA BASED ON INCOMPLETE HOURLY RECORDS
4. AVERAGE WIND SPEEDS ARE FOR PREDOMINANT DIRECTION ONLY
5. SHADING REPRESENTS MOUNTAINOUS AND INTERMEDIATE AREAS
6. PLOTTED NUMBERS ARE PERCENT FREQUENCY OF INDICATED DIRECTION
SCALE IN MILES
0 10 20 40 60 80
OREGON
NEVADA
MEXICO
ARIZ.
C-2238-F-10

Figure 6.2-2

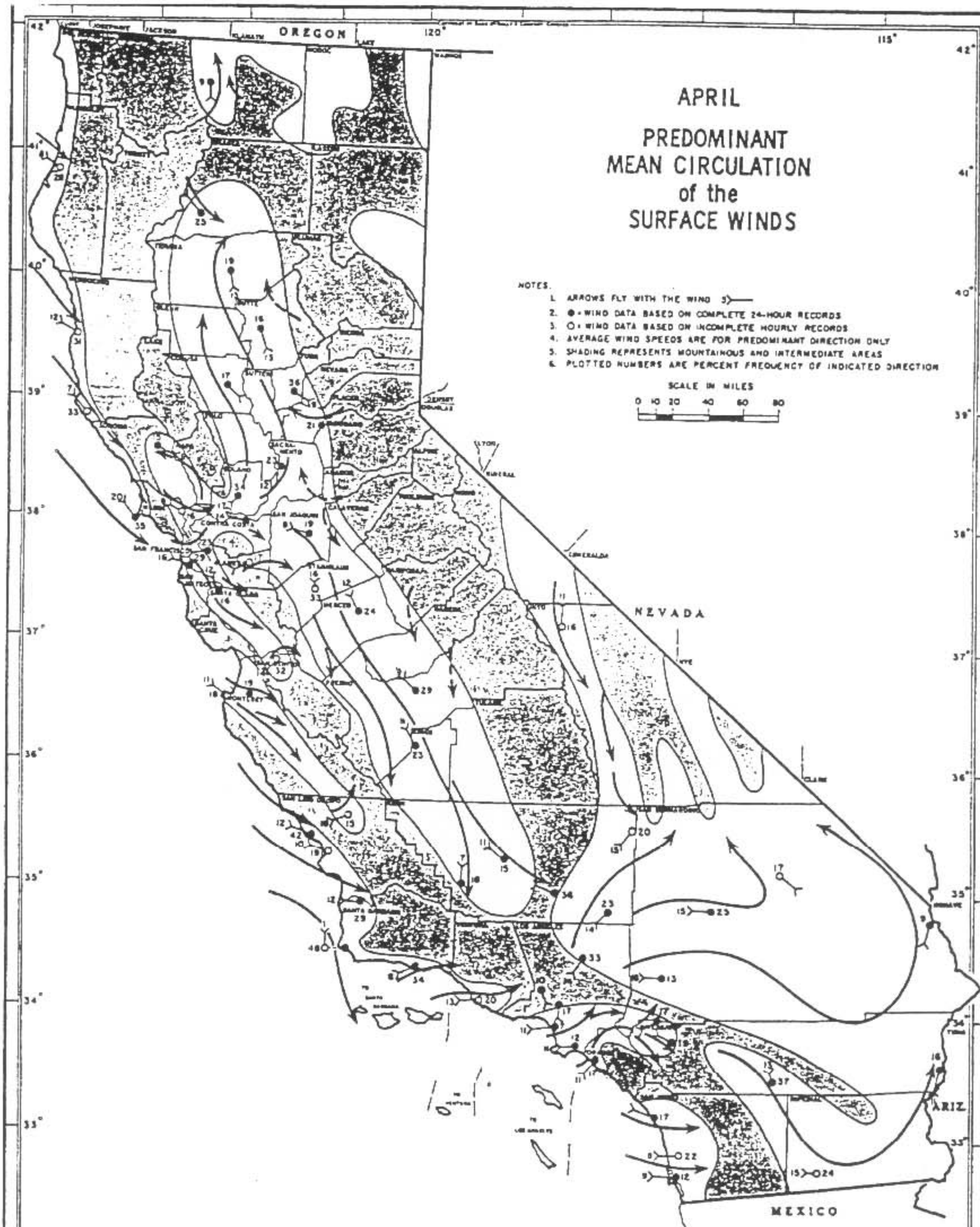

APRIL
PREDOMINANT
MEAN CIRCULATION
of the
SURFACE WINDS
NOTES.
1. ARROWS FLY WITH THE WIND
2. ● = WIND DATA BASED ON COMPLETE 24-HOUR RECORDS
3. ○ = WIND DATA BASED ON INCOMPLETE HOURLY RECORDS
4. AVERAGE WIND SPEEDS ARE FOR PREDOMINANT DIRECTION ONLY
5. SHADING REPRESENTS MOUNTAINOUS AND INTERMEDIATE AREAS
6. PLOTTED NUMBERS ARE PERCENT FREQUENCY OF INDICATED DIRECTION
SCALE IN MILES
OREGON
NEVADA
MEXICO
ARIZ.
C-2238-F-11

Figure 6.2-3

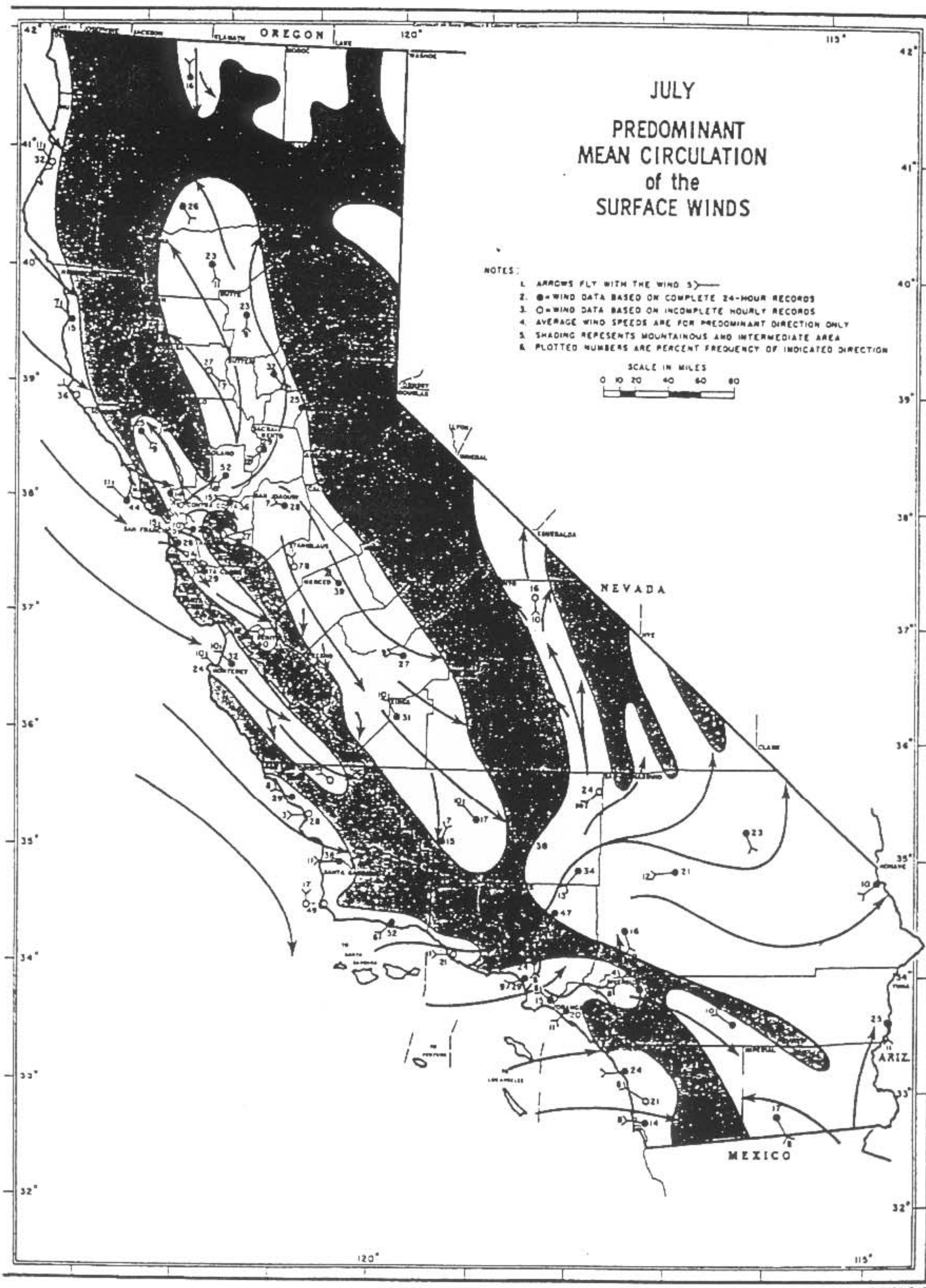
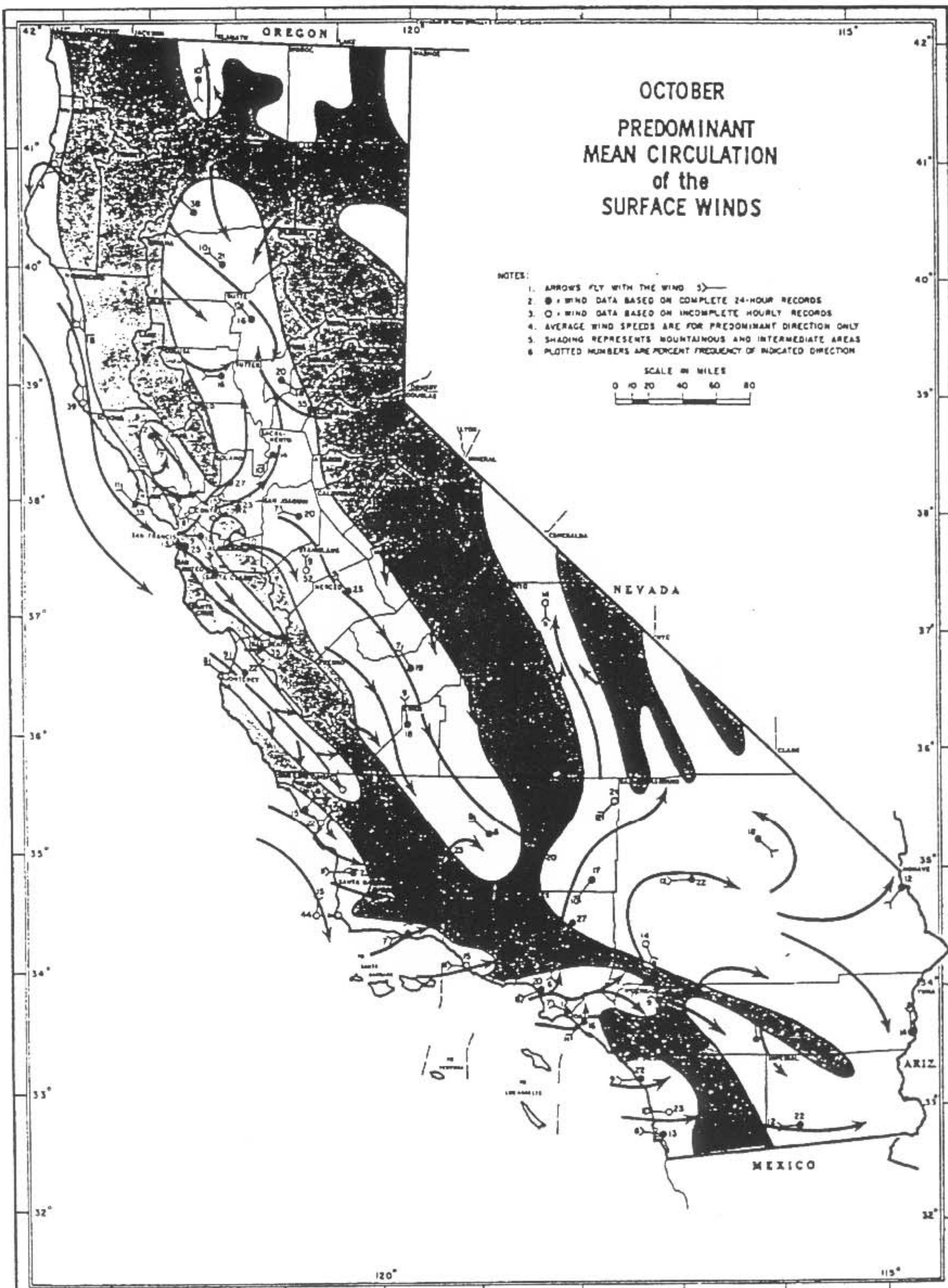

JULY
PREDOMINANT
MEAN CIRCULATION
of the
SURFACE WINDS
NOTES:
1. ARROWS FLY WITH THE WIND
2. ● = WIND DATA BASED ON COMPLETE 24-HOUR RECORDS
3. ○ = WIND DATA BASED ON INCOMPLETE HOURLY RECORDS
4. AVERAGE WIND SPEEDS ARE FOR PREDOMINANT DIRECTION ONLY
5. SHADING REPESENTS MOUNTAINOUS AND INTERMEDIATE AREA
6. PLOTTED NUMBERS ARE PERCENT FREQUENCY OF INDICATED DIRECTION
SCALE IN MILES
0 10 20 40 60 80
OREGON
NEVADA
MEXICO
ARIZ.
C-2238-F-12

Figure 6.2-4



C-2238-F-13

Figure 6.2-5a

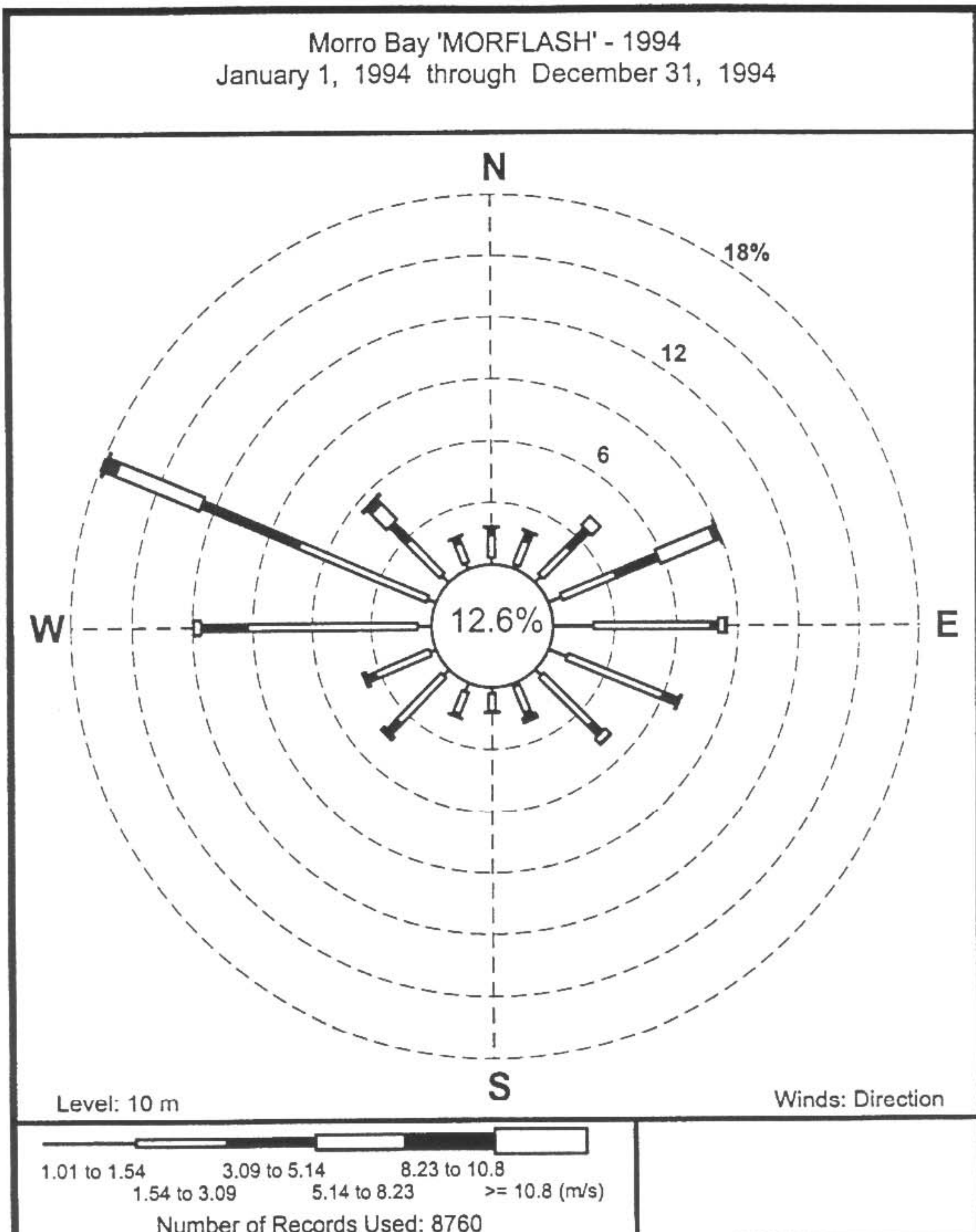

Morro Bay 'MORFLASH' - 1994
January 1, 1994 through December 31, 1994
N
18%
12
6
W
12.6%
E
S
Level: 10 m
Winds: Direction
1.01 to 1.54
3.09 to 5.14
8.23 to 10.8
1.54 to 3.09
5.14 to 8.23
>= 10.8 (m/s)
Number of Records Used: 8760

Figure 6.2-5b

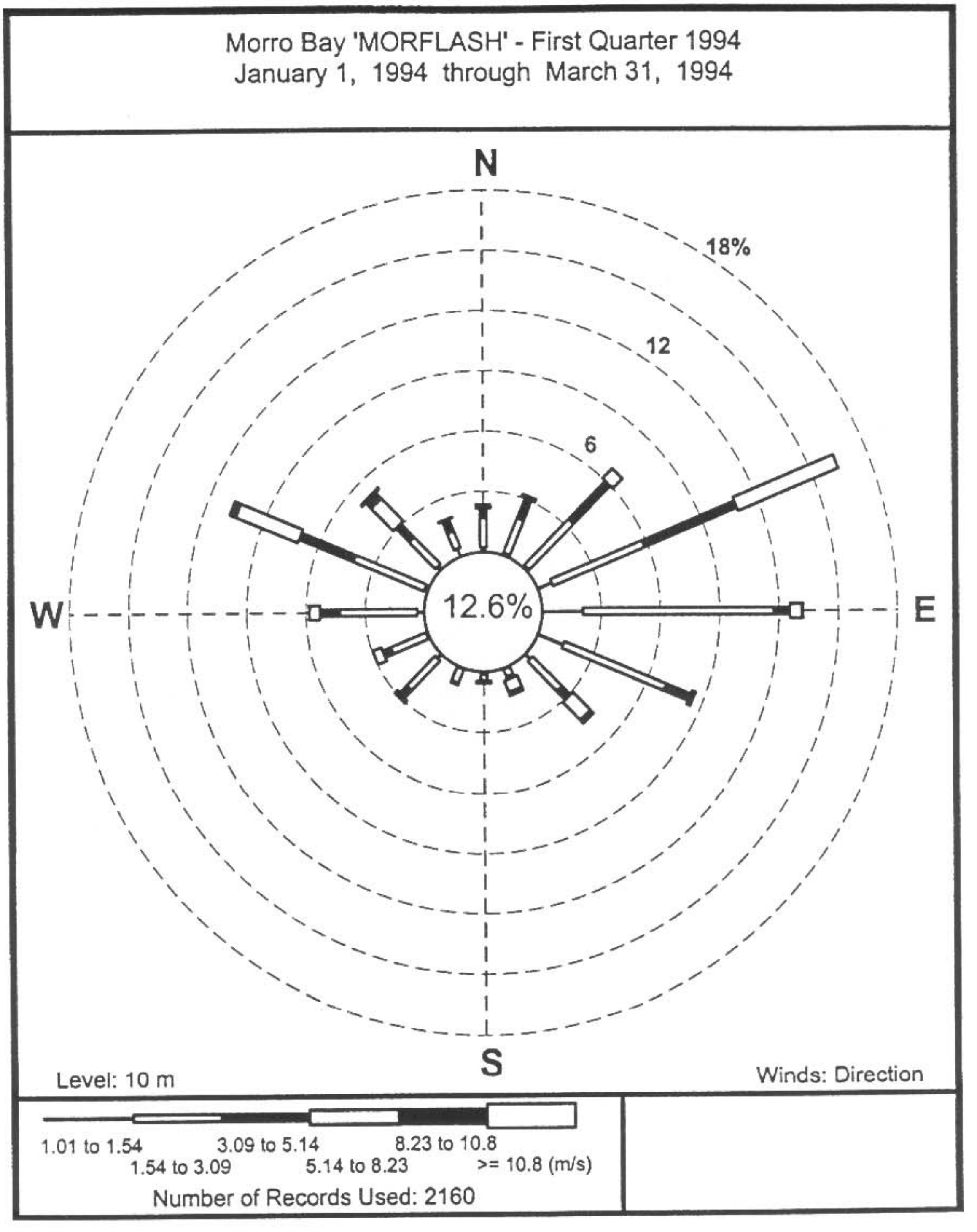

Morro Bay 'MORFLASH' - First Quarter 1994
January 1, 1994 through March 31, 1994
N
18%
12
6
W
12.6%
E
S
Level: 10 m
Winds: Direction
1.01 to 1.54
1.54 to 3.09
3.09 to 5.14
5.14 to 8.23
8.23 to 10.8
>= 10.8 (m/s)
Number of Records Used: 2160

Figure 6.2-5c

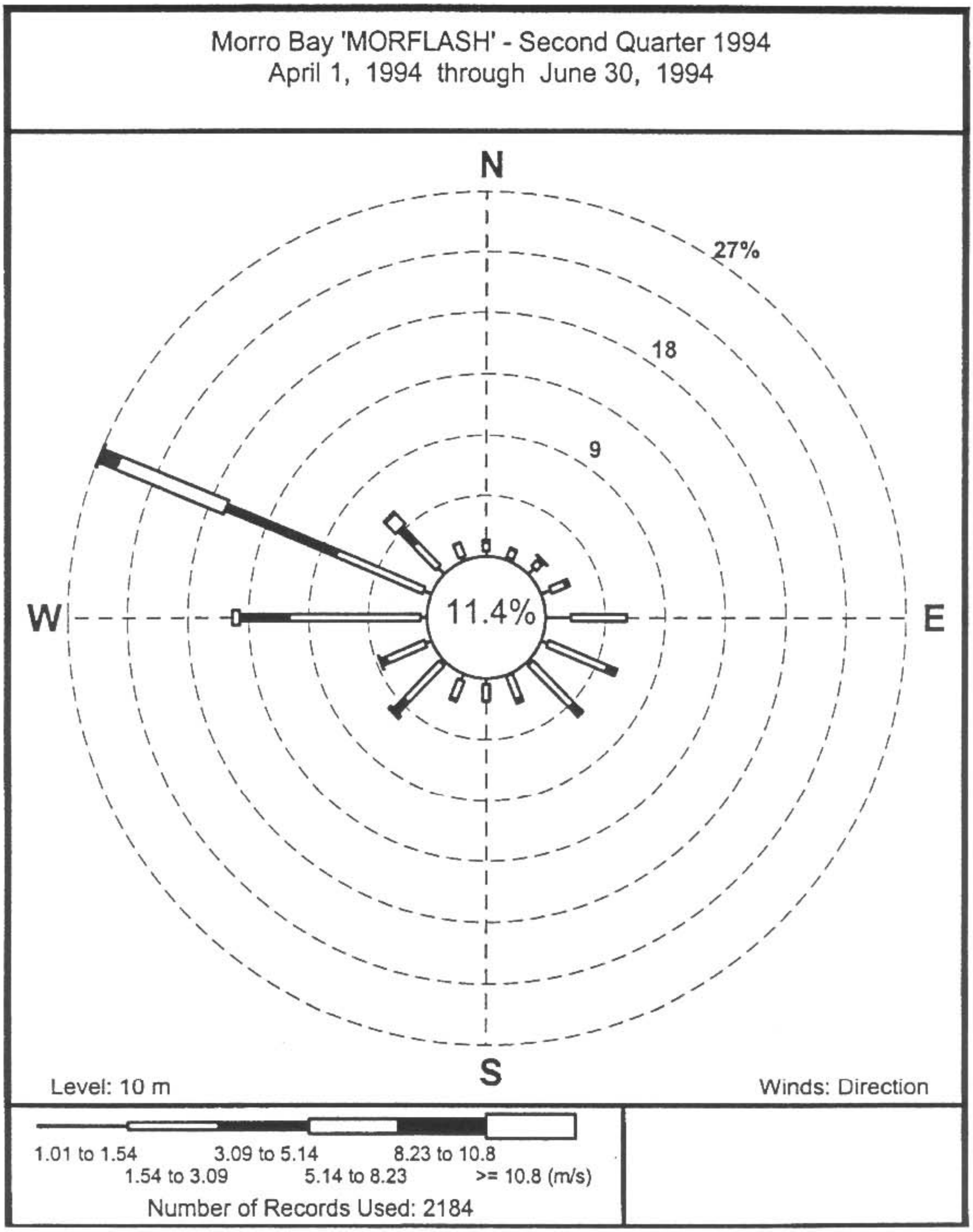
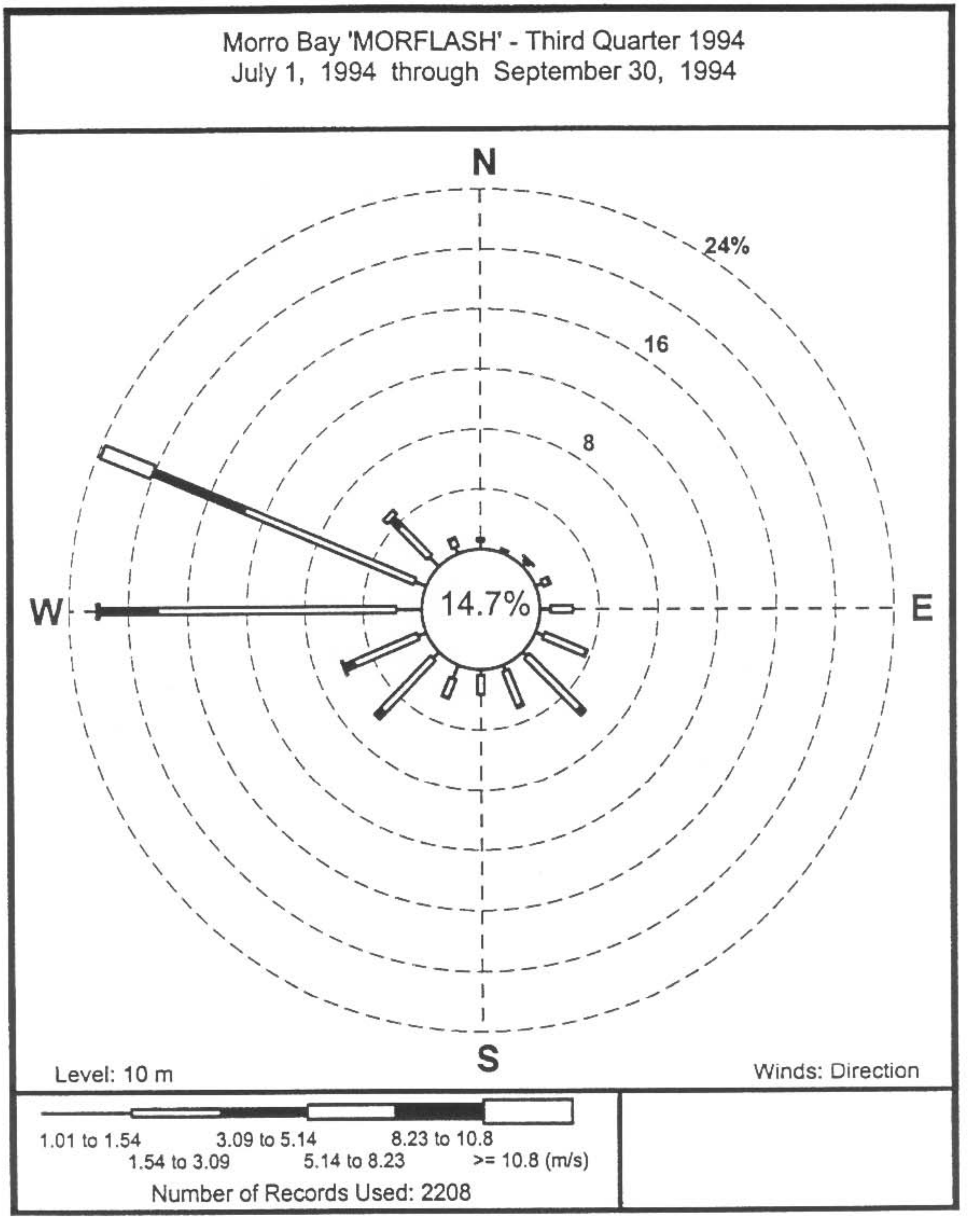

Morro Bay 'MORFLASH' - Second Quarter 1994
April 1, 1994 through June 30, 1994
N
27%
18
9
W
11.4%
E
S
Level: 10 m
Winds: Direction
1.01 to 1.54
3.09 to 5.14
8.23 to 10.8
1.54 to 3.09
5.14 to 8.23
>= 10.8 (m/s)
Number of Records Used: 2184

Figure 6.2-5d



Morro Bay 'MORFLASH' - Third Quarter 1994
July 1, 1994 through September 30, 1994
N
24%
16
8
W
14.7%
E
S
Level: 10 m
Winds: Direction
1.01 to 1.54
1.54 to 3.09
3.09 to 5.14
5.14 to 8.23
8.23 to 10.8
>= 10.8 (m/s)
Number of Records Used: 2208

Figure 6.2-5e

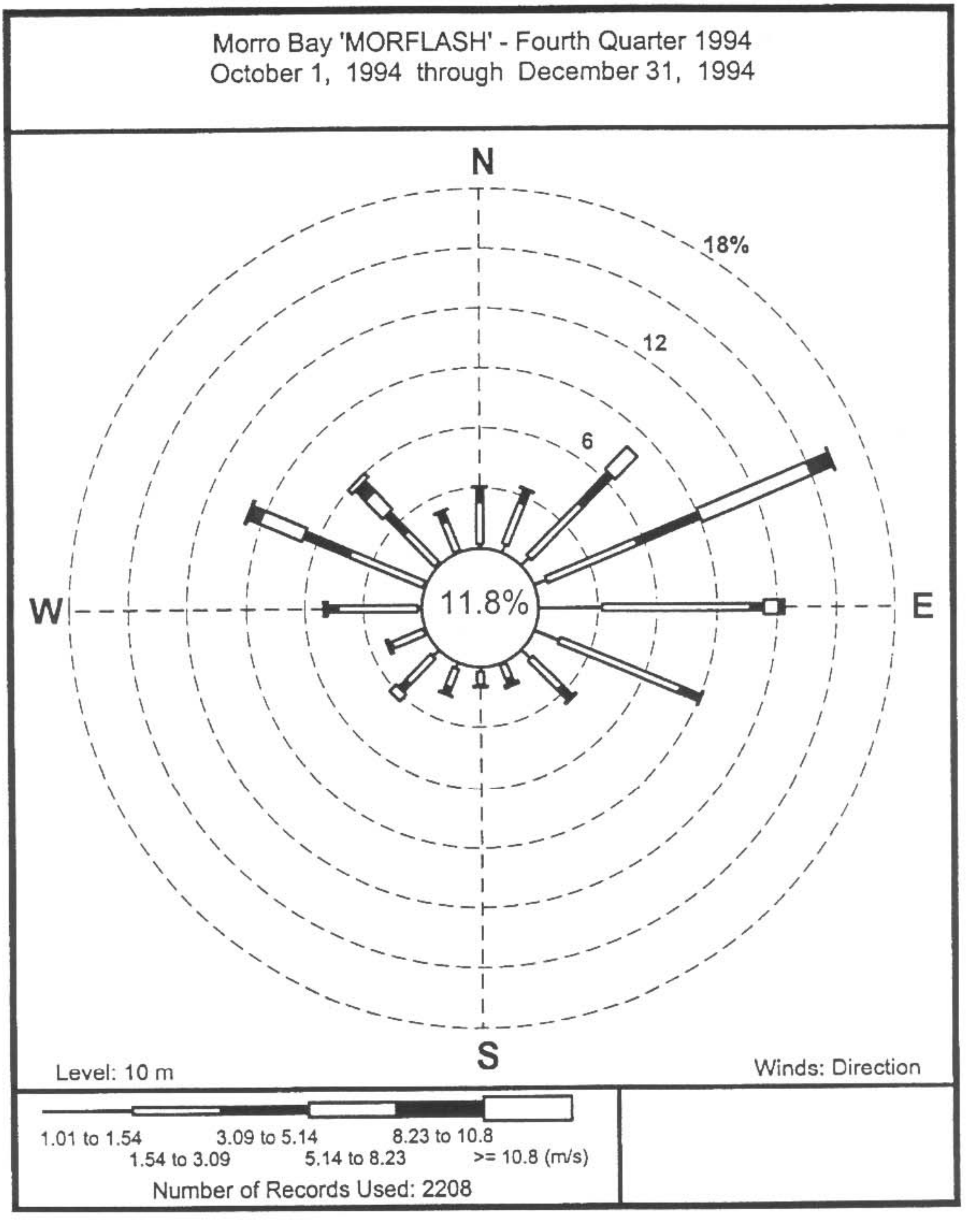
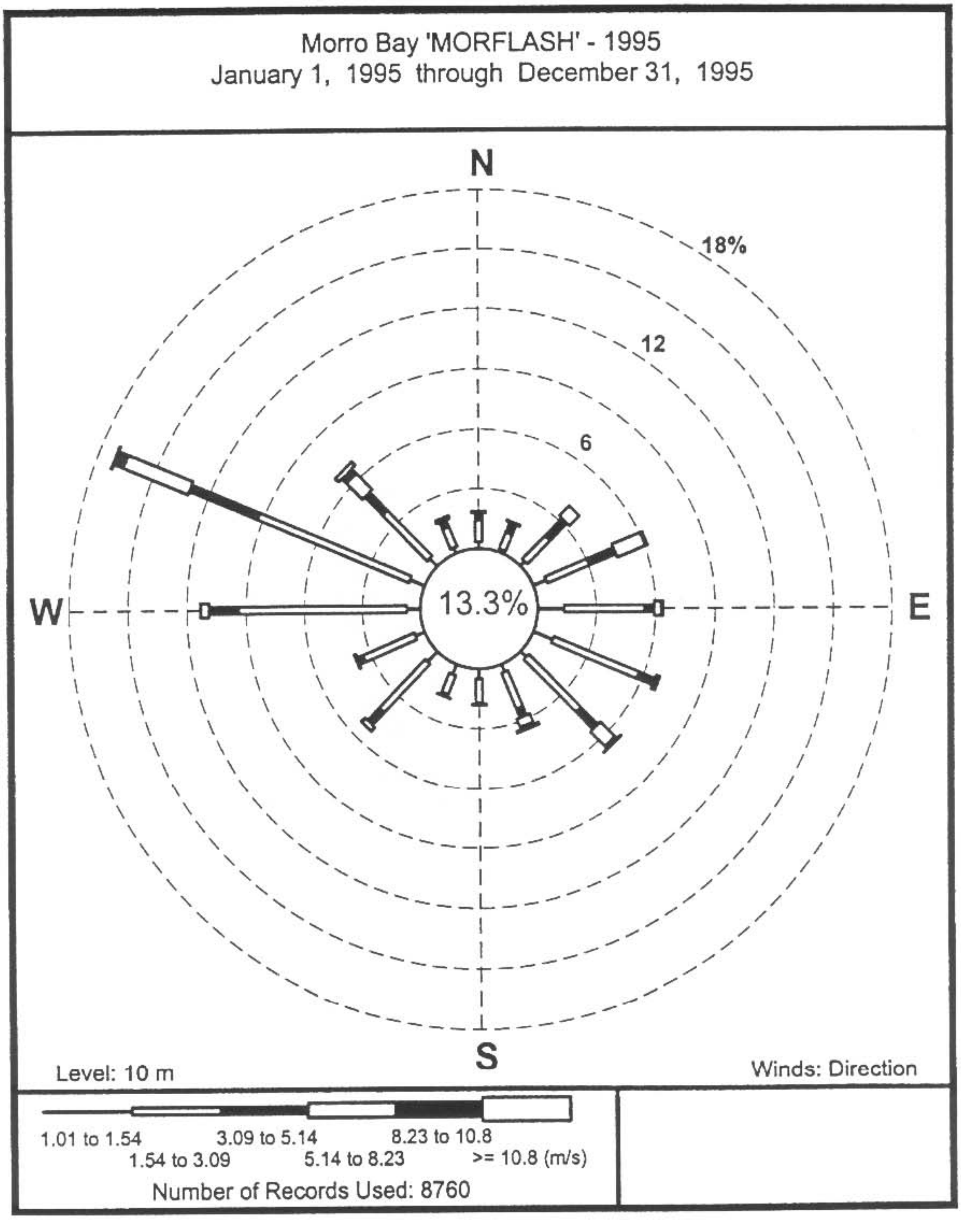

Morro Bay 'MORFLASH' - Fourth Quarter 1994
October 1, 1994 through December 31, 1994
N
18%
12
6
W
11.8%
E
S
Level: 10 m
Winds: Direction
1.01 to 1.54
1.54 to 3.09
3.09 to 5.14
5.14 to 8.23
8.23 to 10.8
>= 10.8 (m/s)
Number of Records Used: 2208

Figure 6.2-6a



Morro Bay 'MORFLASH' - 1995
January 1, 1995 through December 31, 1995
N
18%
12
6
W
13.3%
E
S
Level: 10 m
Winds: Direction
1.01 to 1.54
3.09 to 5.14
8.23 to 10.8
1.54 to 3.09
5.14 to 8.23
>= 10.8 (m/s)
Number of Records Used: 8760

Figure 6.2-6b

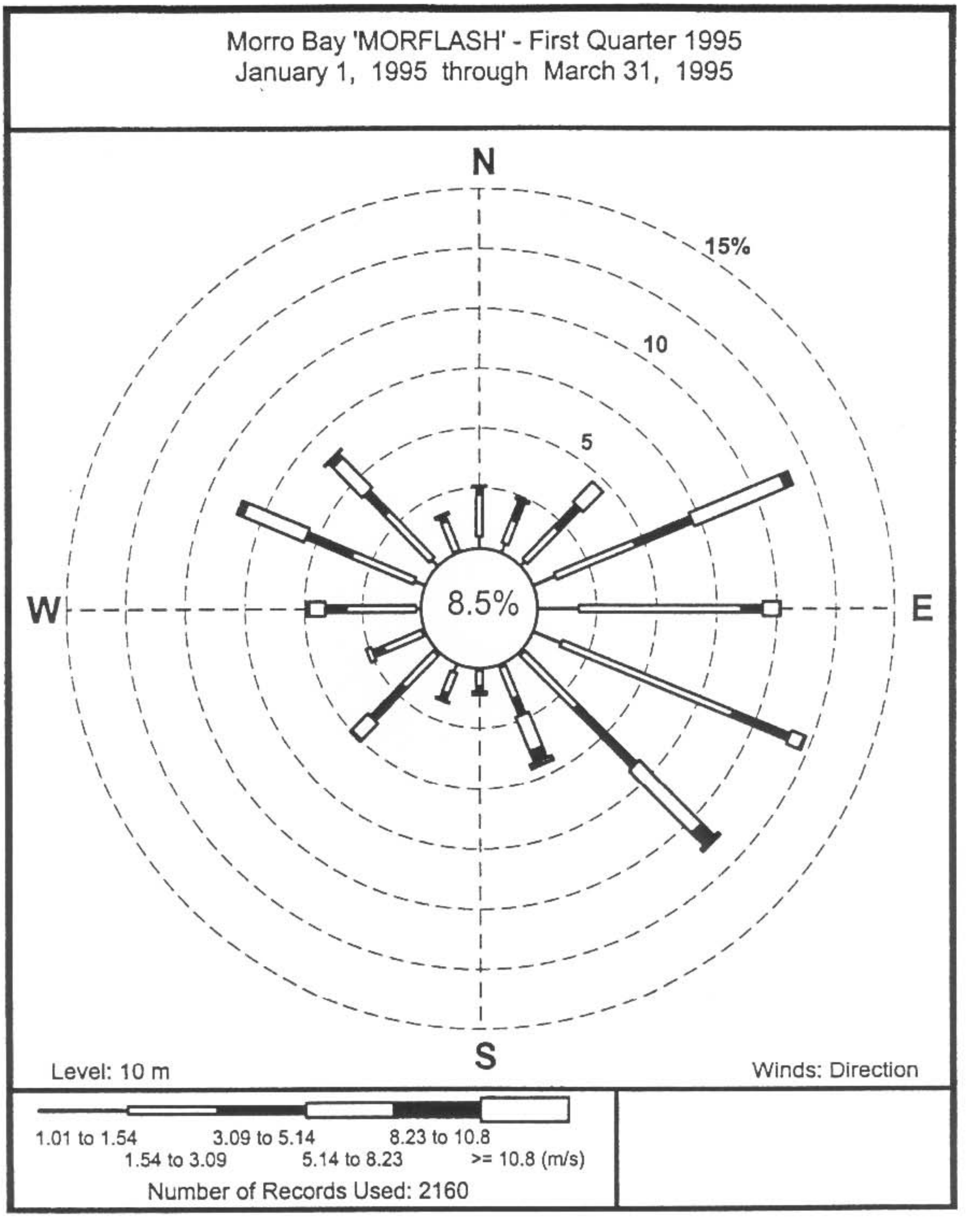
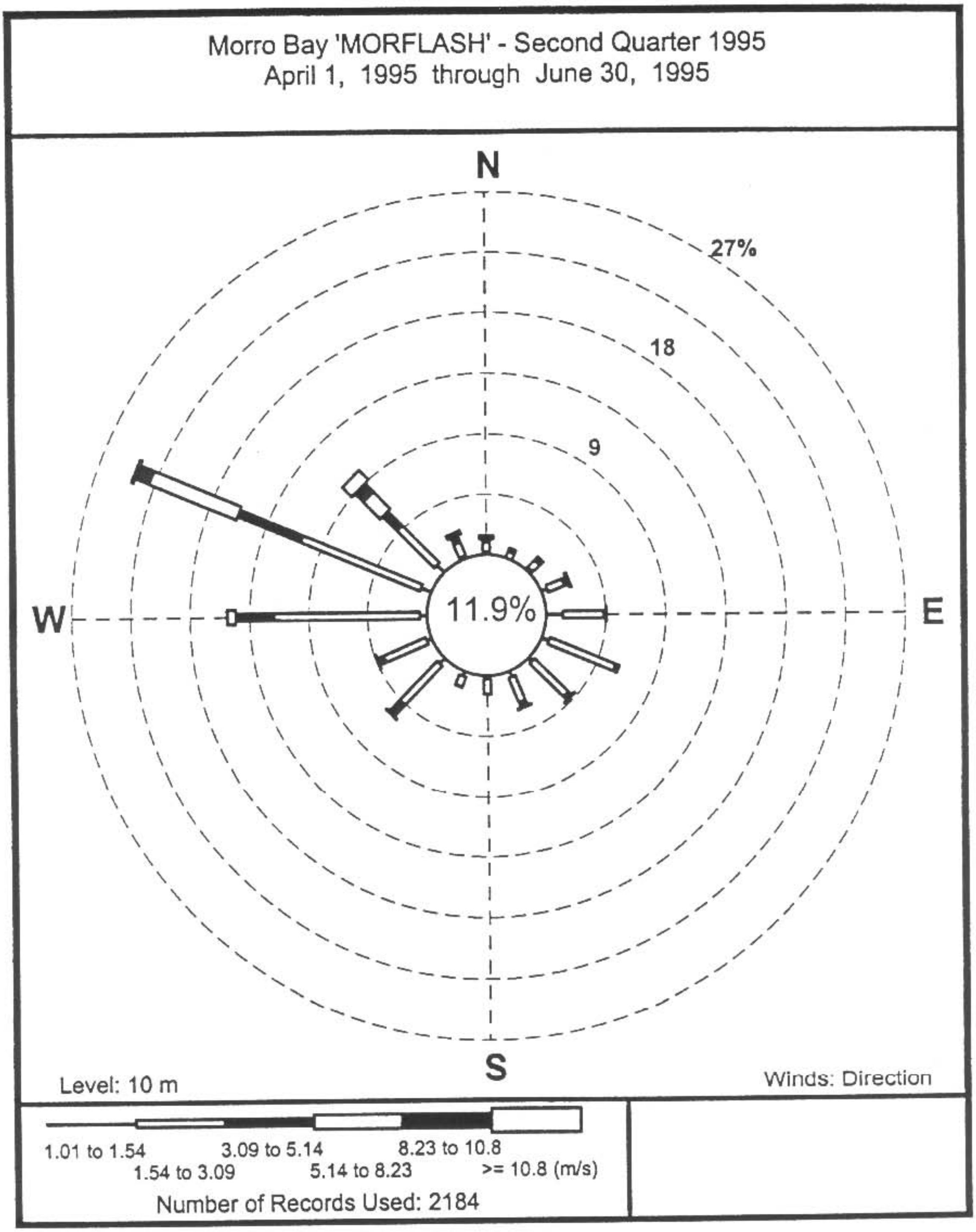
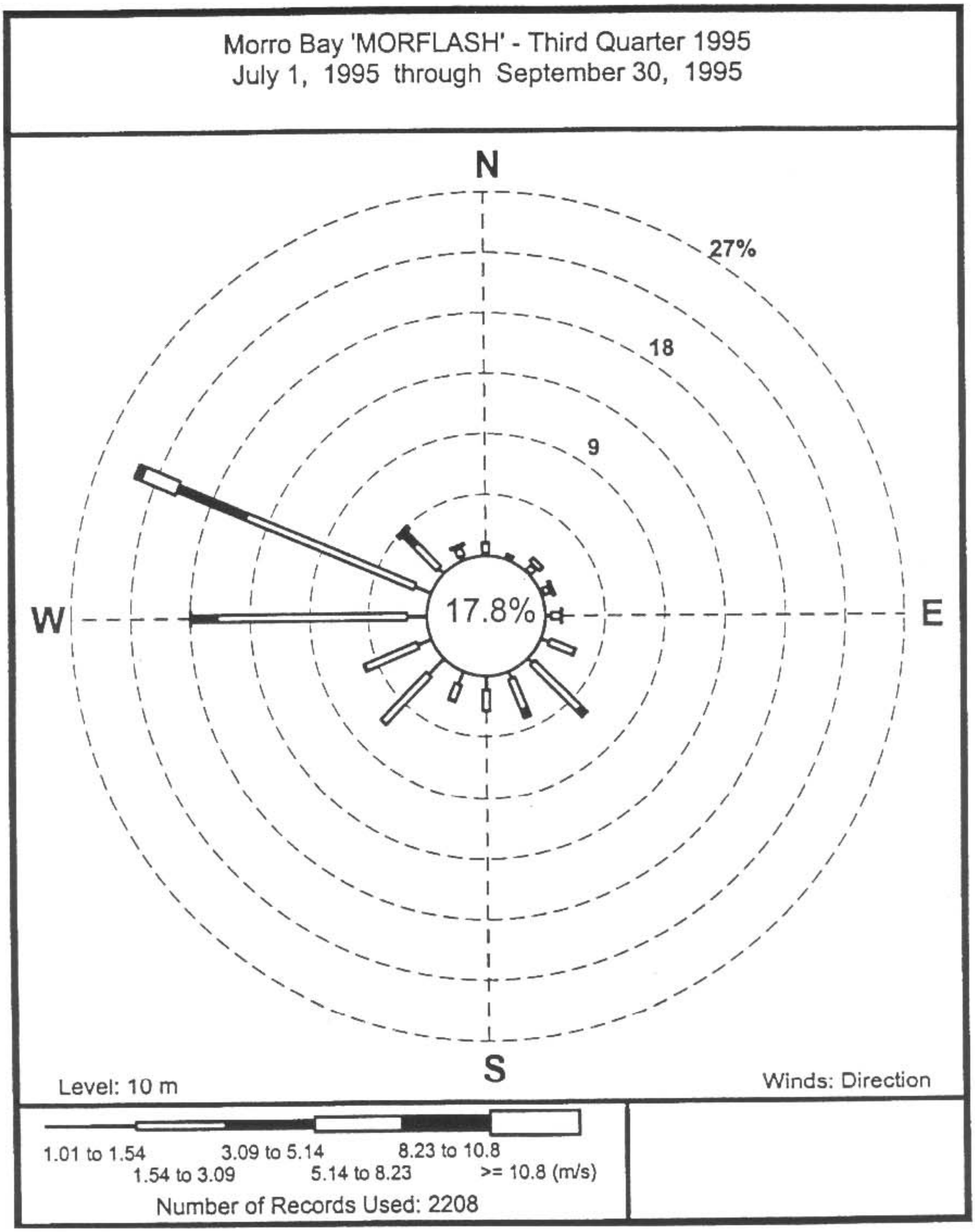

Morro Bay 'MORFLASH' - First Quarter 1995
January 1, 1995 through March 31, 1995
N
15%
10
5
W
8.5%
E
S
Level: 10 m
Winds: Direction
1.01 to 1.54
3.09 to 5.14
8.23 to 10.8
1.54 to 3.09
5.14 to 8.23
>= 10.8 (m/s)
Number of Records Used: 2160

Figure 6.2-6c



Morro Bay 'MORFLASH' - Second Quarter 1995
April 1, 1995 through June 30, 1995
N
27%
18
9
W
11.9%
E
S
Level: 10 m
Winds: Direction
1.01 to 1.54
1.54 to 3.09
3.09 to 5.14
5.14 to 8.23
8.23 to 10.8
>= 10.8 (m/s)
Number of Records Used: 2184

Figure 6.2-6d



Morro Bay 'MORFLASH' - Third Quarter 1995
July 1, 1995 through September 30, 1995
N
27%
18
9
W
17.8%
E
S
Level: 10 m
Winds: Direction
1.01 to 1.54
1.54 to 3.09
3.09 to 5.14
5.14 to 8.23
8.23 to 10.8
>= 10.8 (m/s)
Number of Records Used: 2208

Figure 6.2-6e

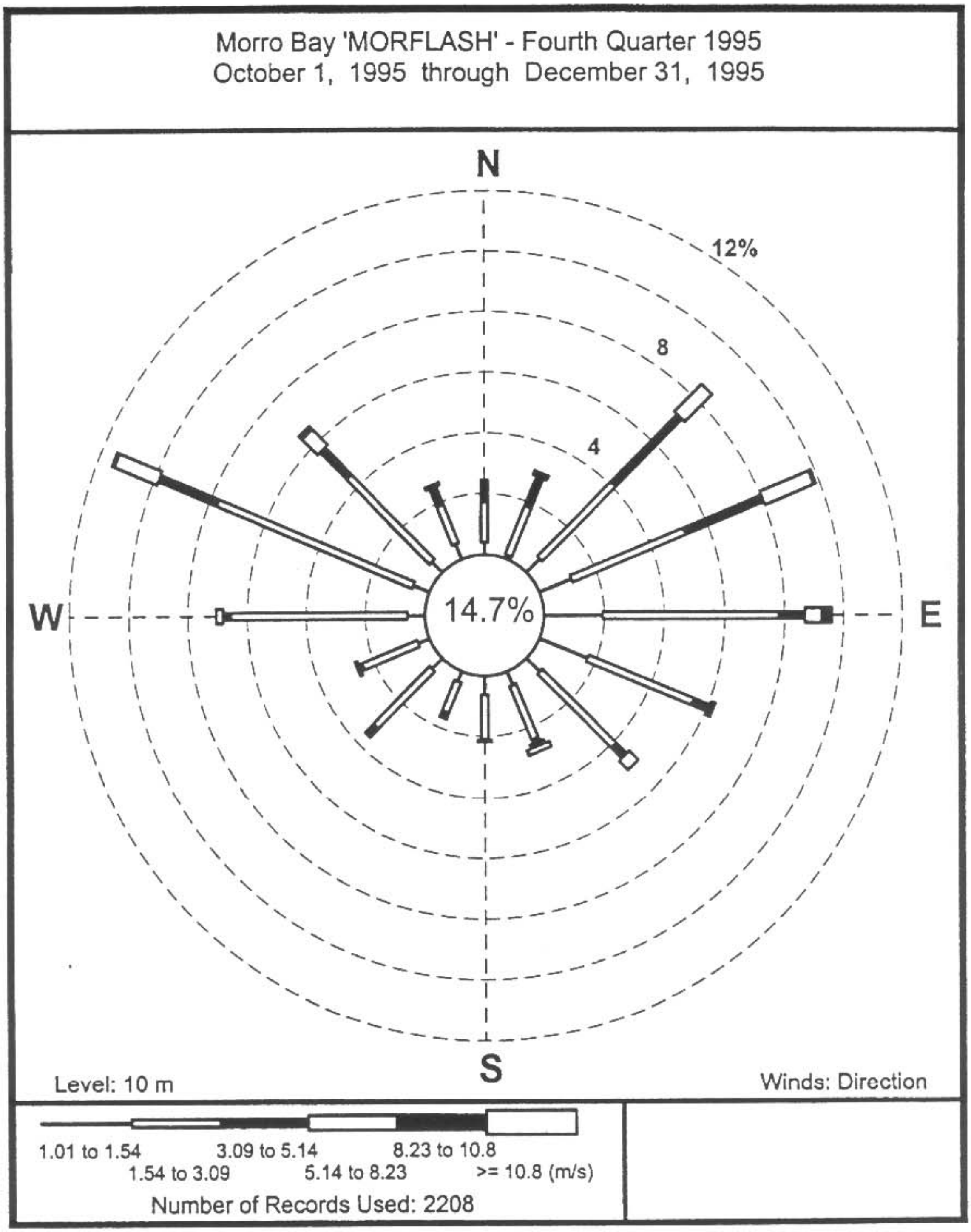
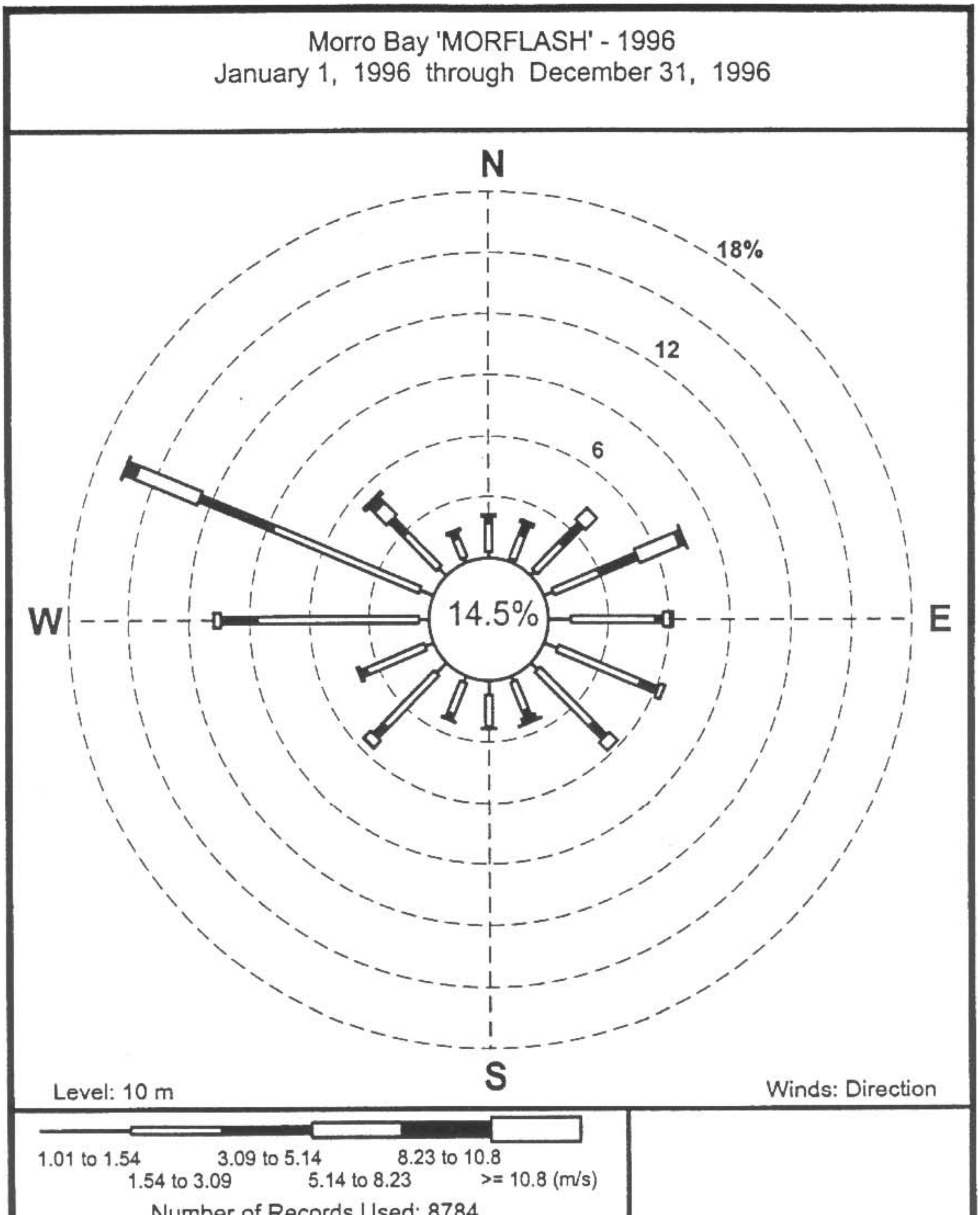
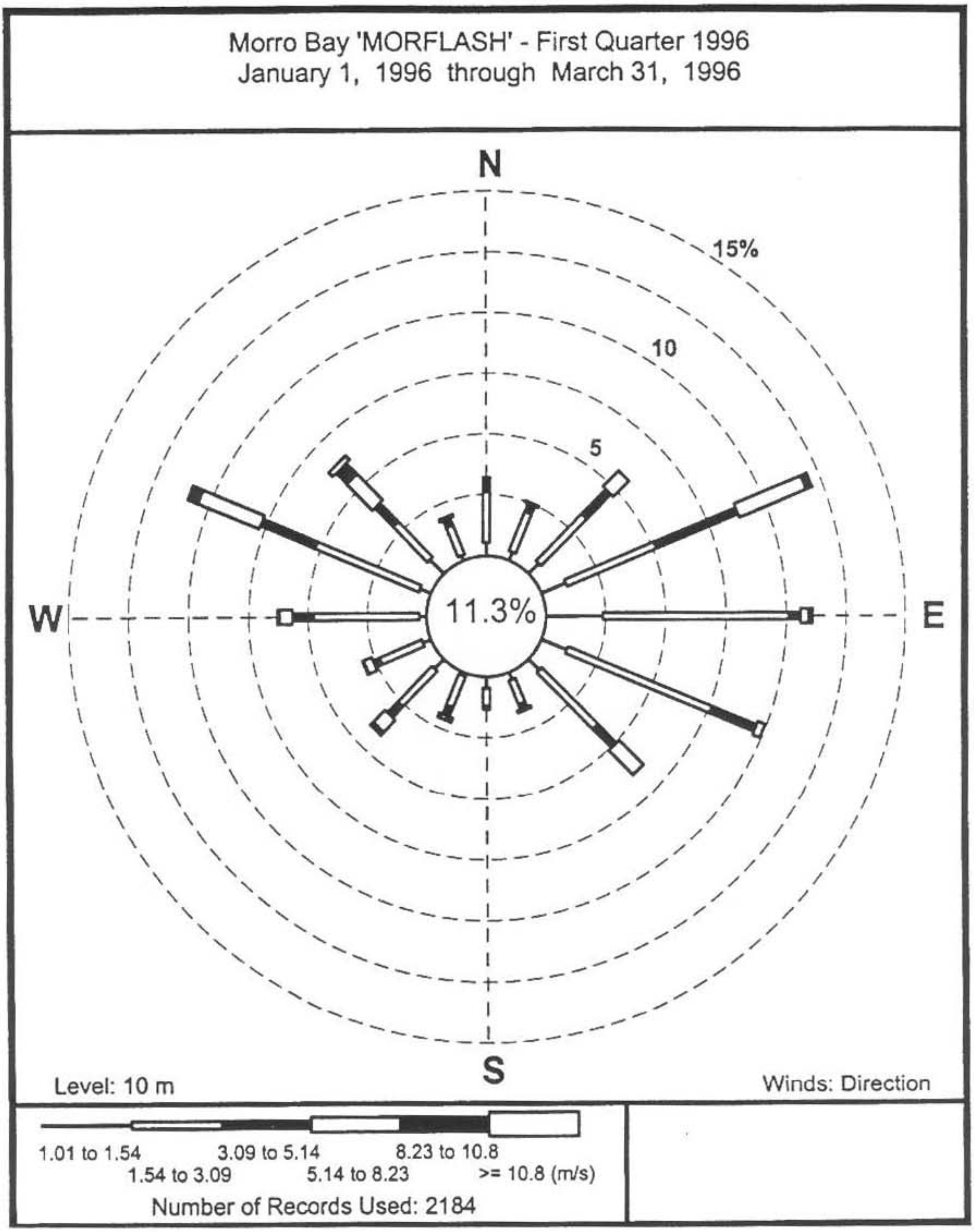

Morro Bay 'MORFLASH' - Fourth Quarter 1995
October 1, 1995 through December 31, 1995
N
12%
8
4
W
14.7%
E
S
Level: 10 m
Winds: Direction
1.01 to 1.54
3.09 to 5.14
8.23 to 10.8
1.54 to 3.09
5.14 to 8.23
>= 10.8 (m/s)
Number of Records Used: 2208

Figure 6.2-7a



Morro Bay 'MORFLASH' - 1996
January 1, 1996 through December 31, 1996
N
18%
12
6
W
14.5%
E
S
Level: 10 m
Winds: Direction
1.01 to 1.54
1.54 to 3.09
3.09 to 5.14
5.14 to 8.23
8.23 to 10.8
>= 10.8 (m/s)
Number of Records Used: 8784

Figure 6.2-7b



Morro Bay 'MORFLASH' - First Quarter 1996
January 1, 1996 through March 31, 1996
N
15%
10
5
W
11.3%
E
S
Level: 10 m
Winds: Direction
1.01 to 1.54
1.54 to 3.09
3.09 to 5.14
5.14 to 8.23
8.23 to 10.8
>= 10.8 (m/s)
Number of Records Used: 2184

Figure 6.2-7c

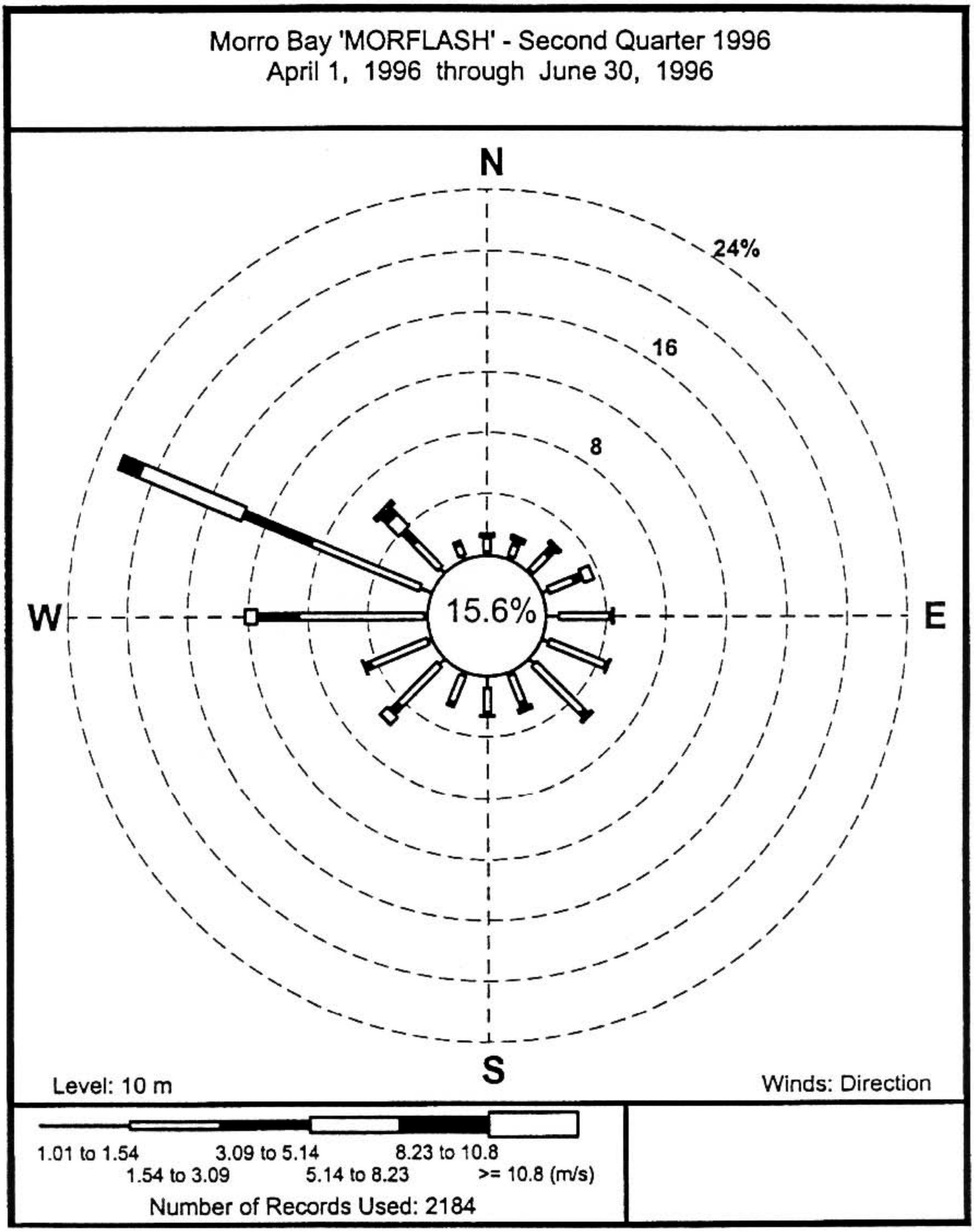

Morro Bay 'MORFLASH' - Second Quarter 1996
April 1, 1996 through June 30, 1996
N
24%
16
8
W
15.6%
E
S
Level: 10 m
Winds: Direction
1.01 to 1.54
3.09 to 5.14
8.23 to 10.8
1.54 to 3.09
5.14 to 8.23
>= 10.8 (m/s)
Number of Records Used: 2184

Figure 6.2-7d

Morro Bay 'MORFLASH' - Third Quarter 1996
July 1, 1996 through September 30, 1996

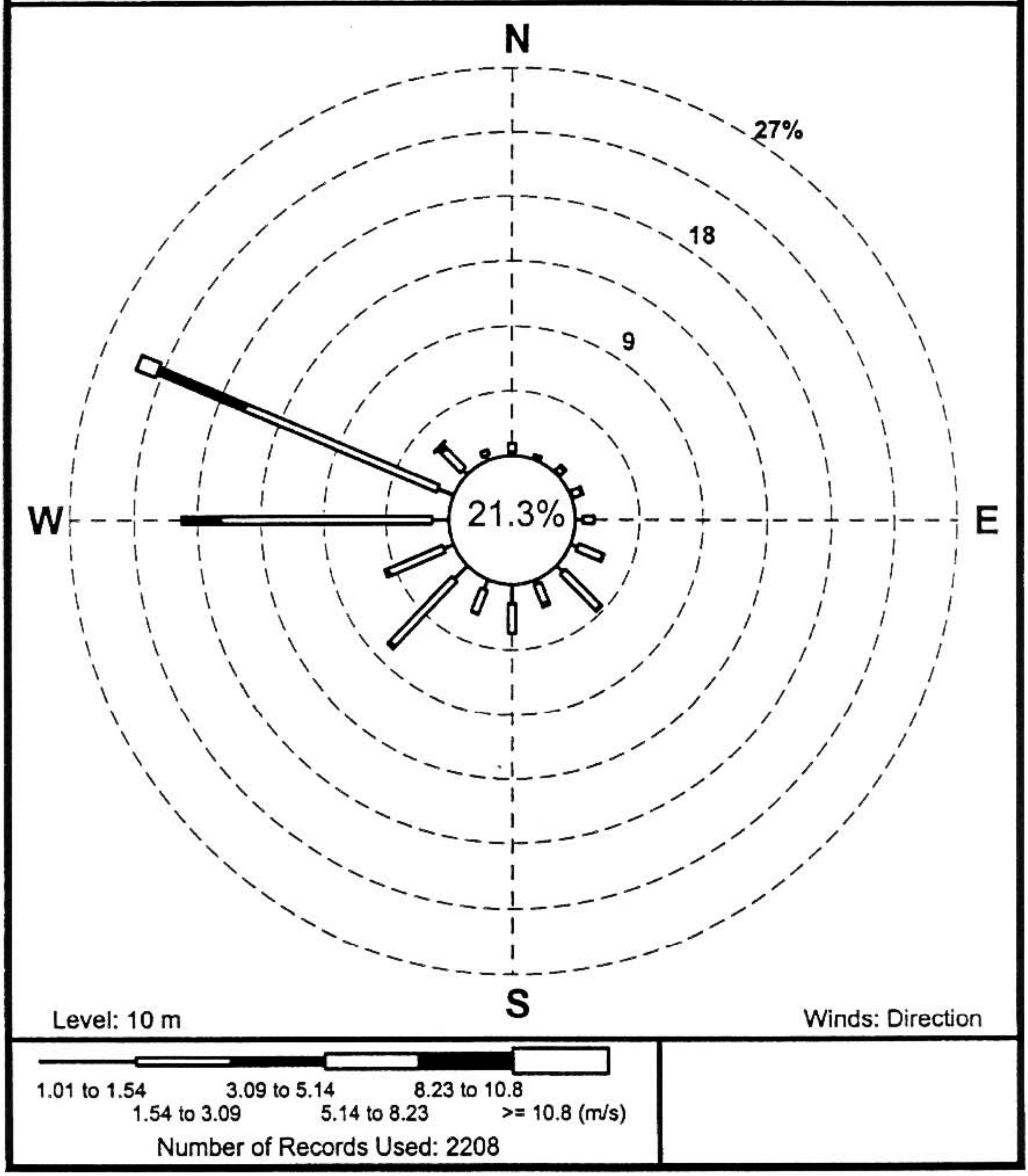


Figure 6.2-7e

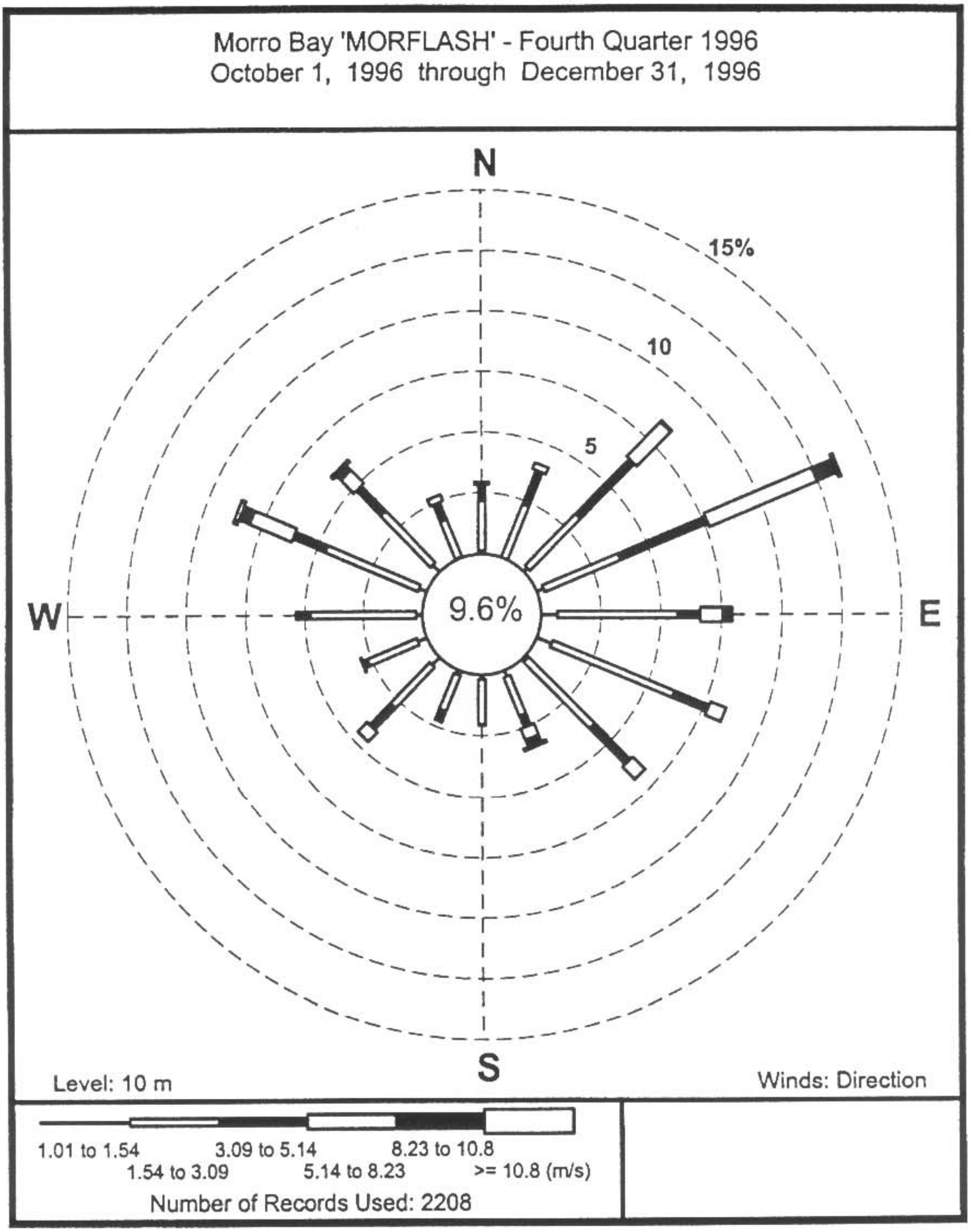

Morro Bay 'MORFLASH' - Fourth Quarter 1996
October 1, 1996 through December 31, 1996
N
15%
10
5
W
9.6%
E
S
Level: 10 m
Winds: Direction
1.01 to 1.54
3.09 to 5.14
8.23 to 10.8
1.54 to 3.09
5.14 to 8.23
>= 10.8 (m/s)
Number of Records Used: 2208

Figure 6.2-8a

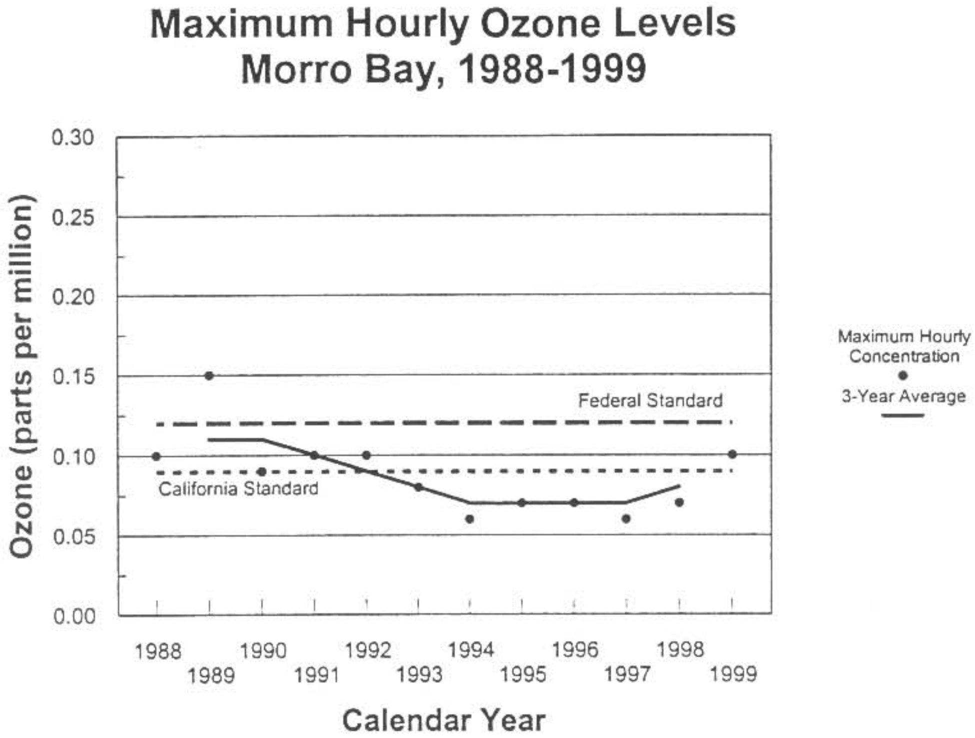


Figure 6.2-8b

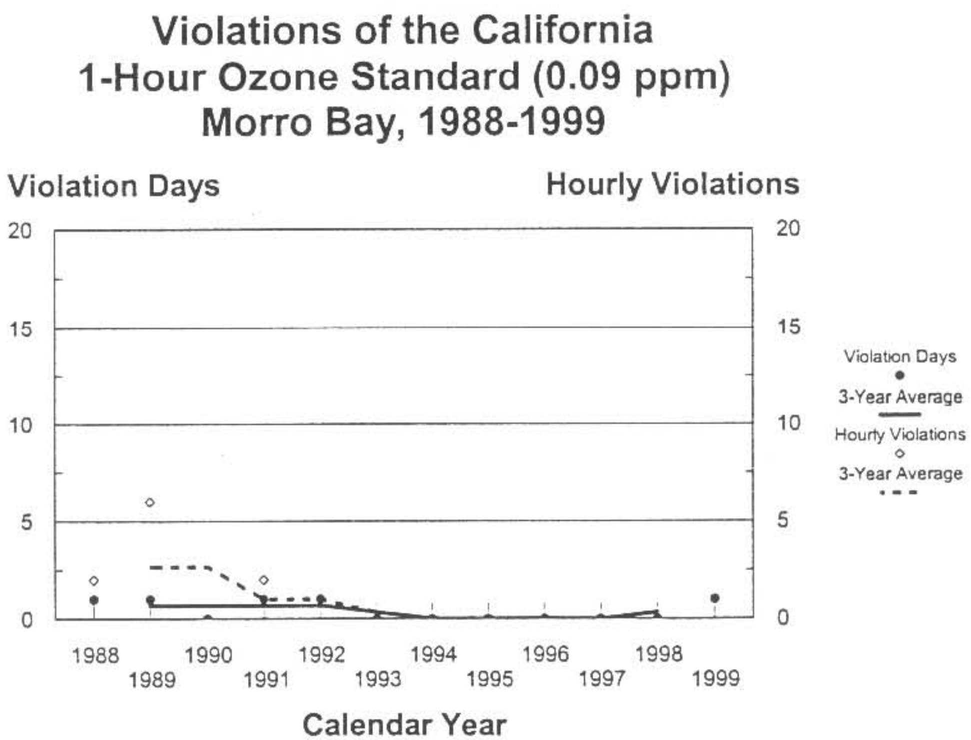


Figure 6.2-9

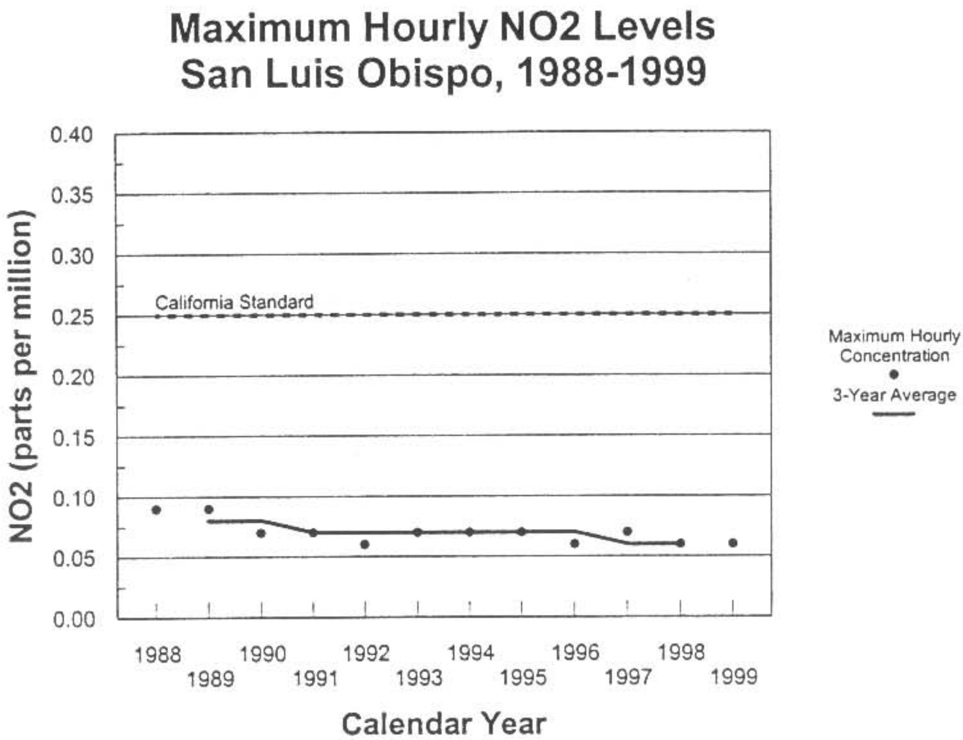

Maximum Hourly NO2 Levels
San Luis Obispo, 1988-1999
NO2 (parts per million)
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
California Standard
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
Calendar Year
Maximum Hourly Concentration
3-Year Average

Figure 6.2-10

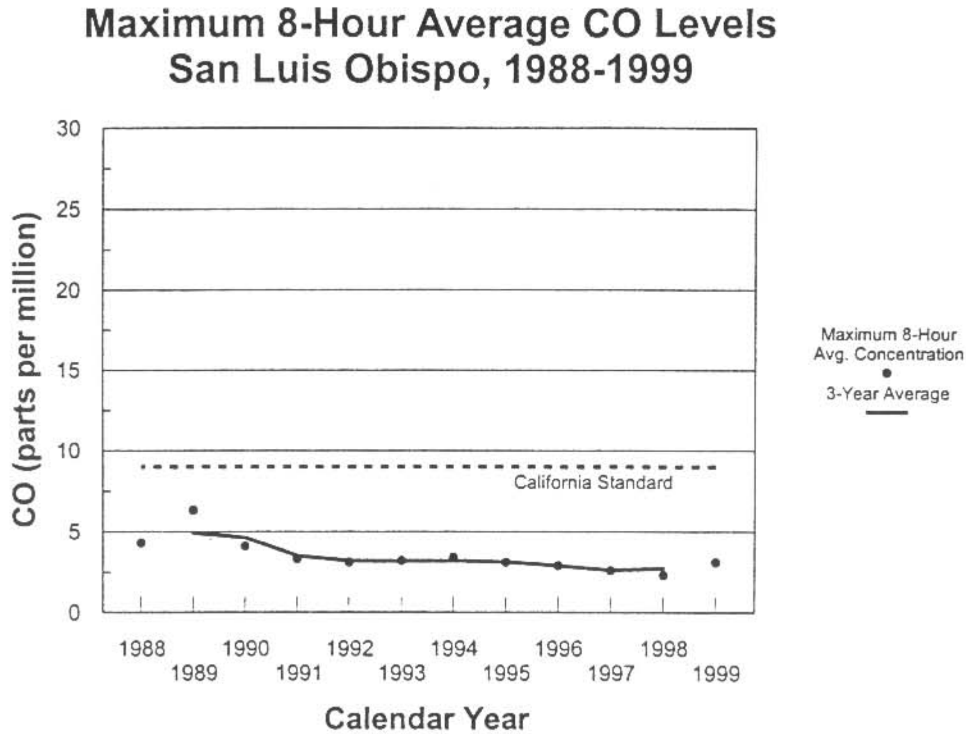


Figure 6.2-11

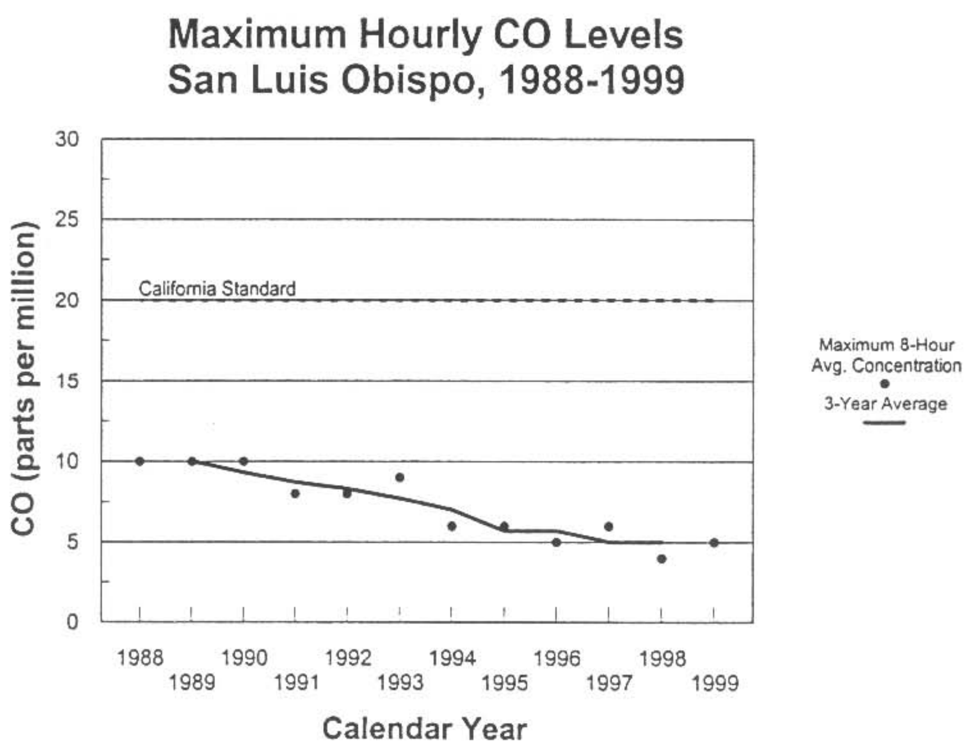


Figure 6.2-12

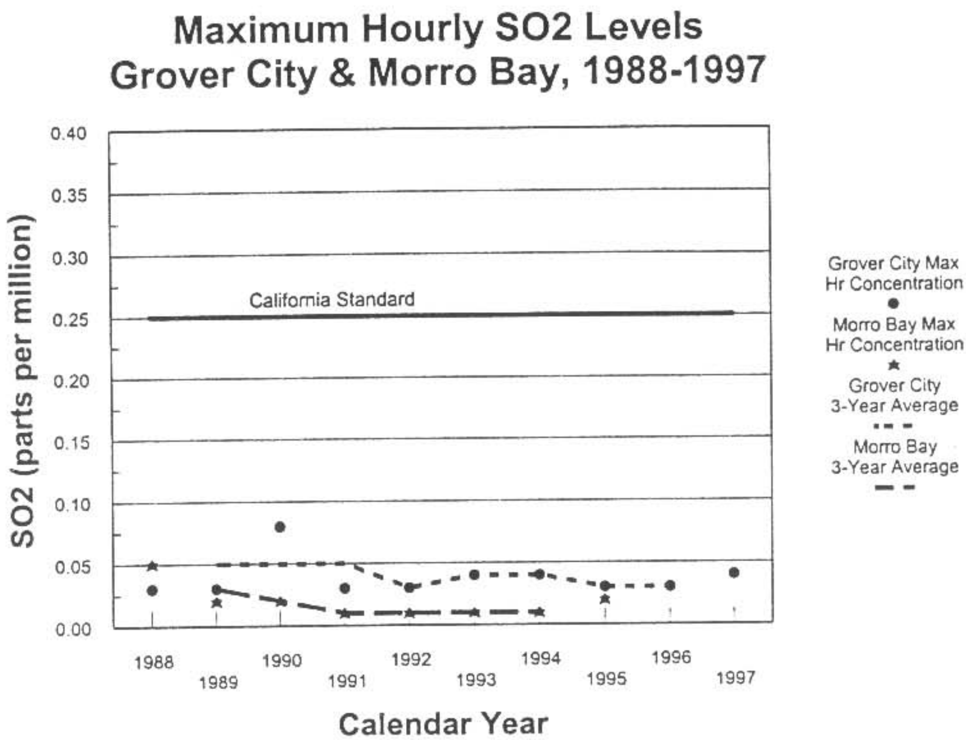

Maximum Hourly SO2 Levels
Grover City & Morro Bay, 1988-1997
SO2 (parts per million)
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
California Standard
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
Calendar Year
Grover City Max Hr Concentration
Morro Bay Max Hr Concentration
Grover City 3-Year Average
Morro Bay 3-Year Average

Figure 6.2-13

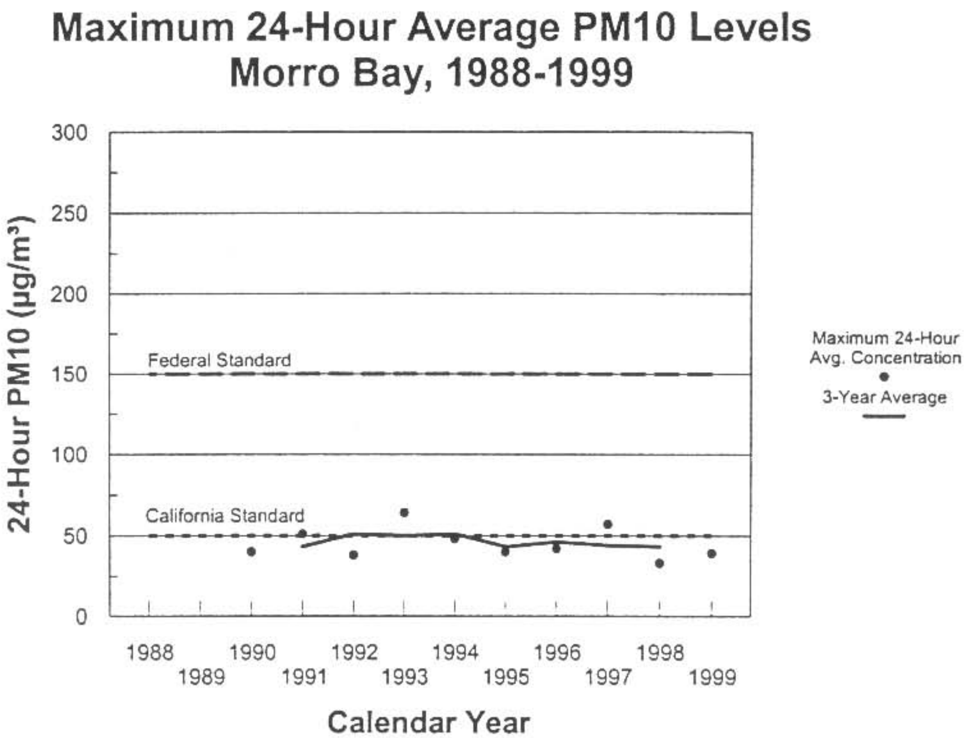


Figure 6.2-14

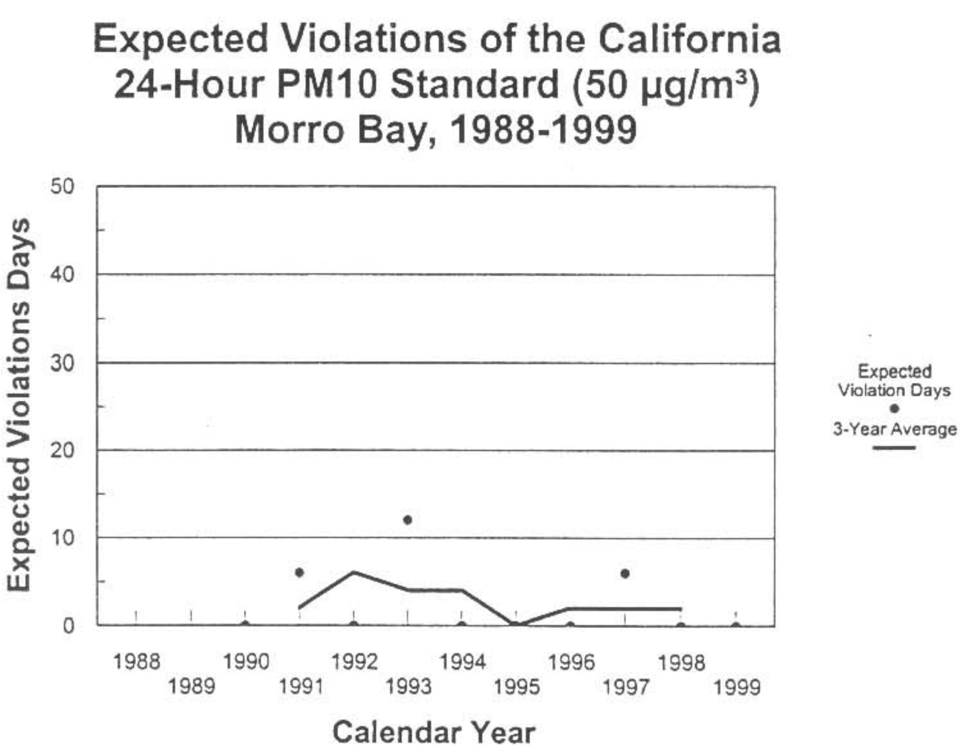
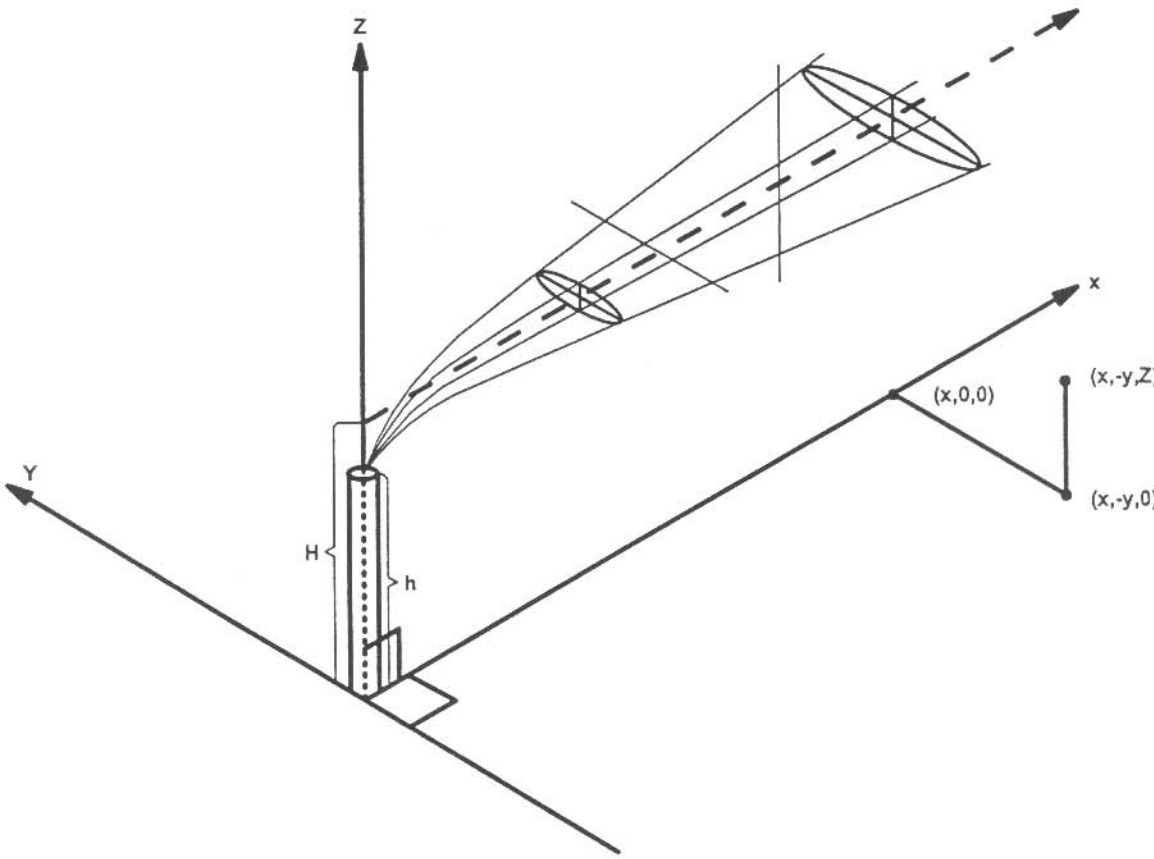
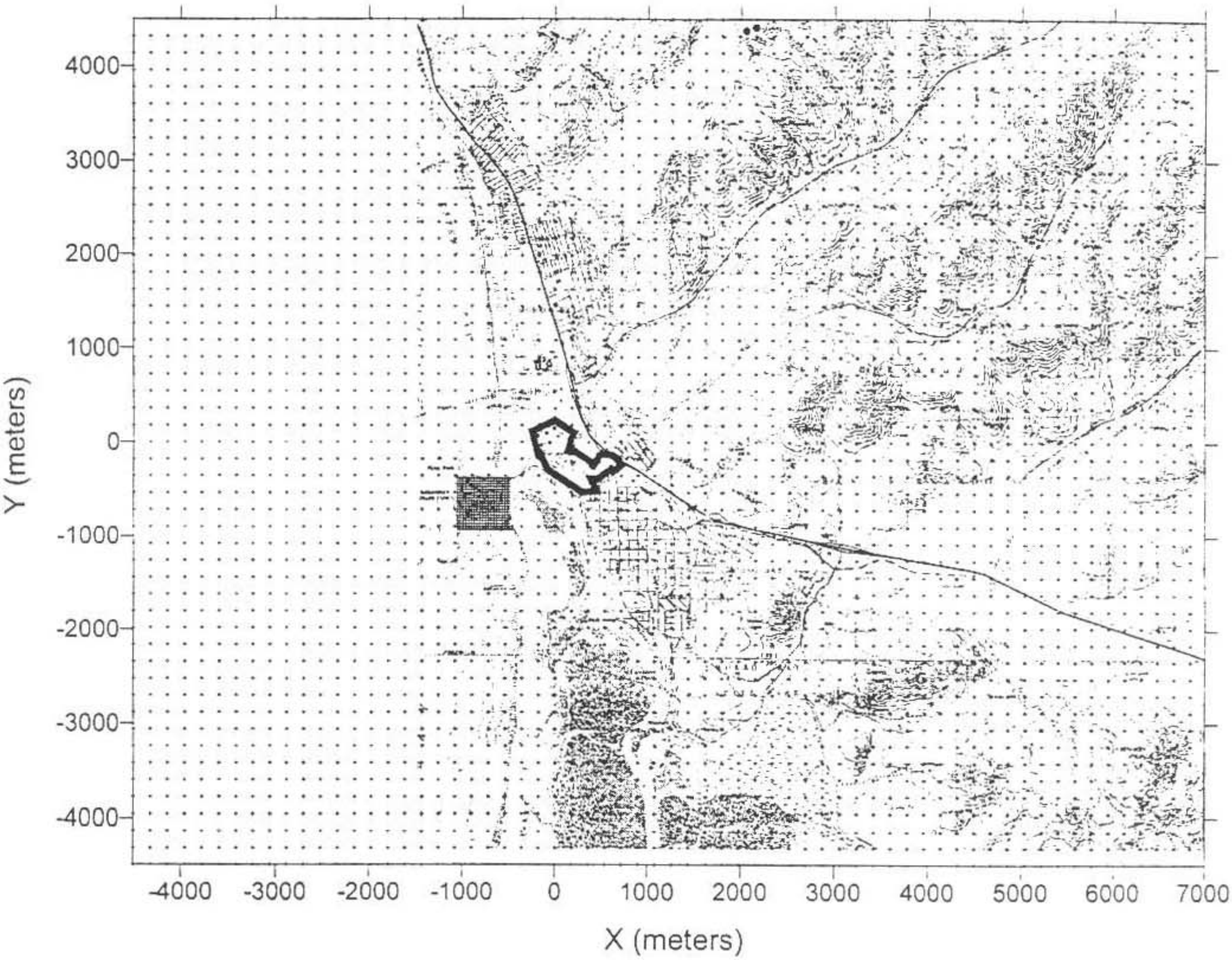


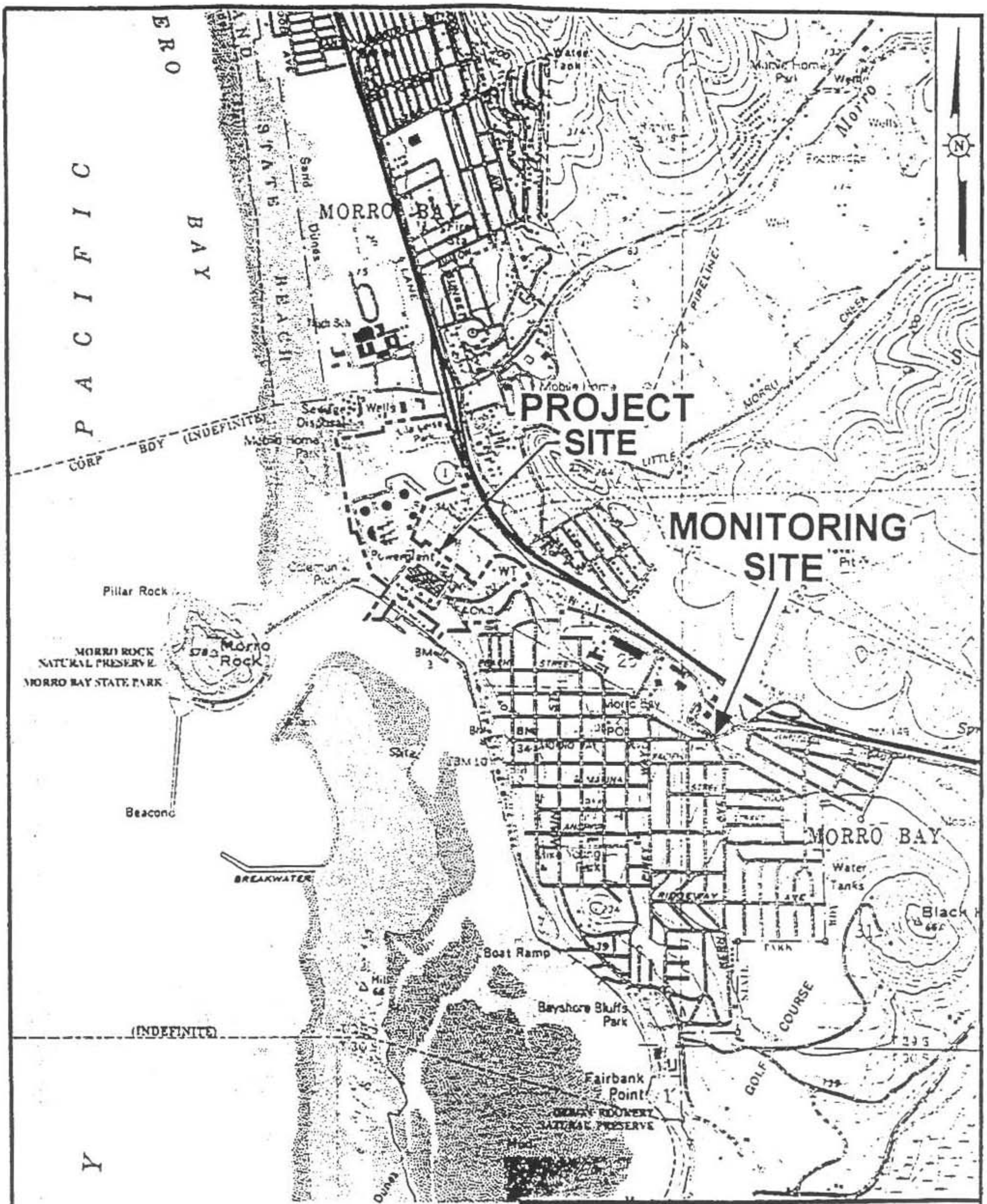
Figure 6.2-15



Coordinate system showing Gaussian distributions in the horizontal and vertical.

Figure 6.2-16
Layout of the Receptor Grid





0 2,000 4,000 FEET

SCALE
SCALE: 1: 24,000

REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC MAP OF MORRO BAY NORTH AND MORRO BAY SOUTH, CALIFORNIA, DATED 1993 AND 1994.

LOCATION OF PM_{10} MONITORING STATION

FIGURE 6.2-17